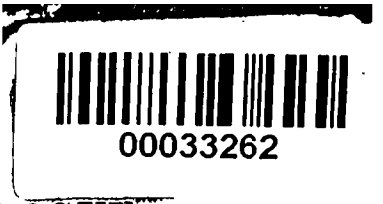
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CATALOGUE

OF

MARINE POLYZOA

IN

THE COLLECTION

OF THE

BRITISH MUSEUM.

PART II.

CHEILOSTOMATA (PART.).

33262

LONDON:

PRINTED BY ORDER OF THE TRUSTEES.

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NOTICE.

IN the present Catalogue it is intended to comprise figures and descriptions of all the species of Marine Polyzoa in the Collection of the British Museum, and from typical specimens therein contained.

This Collection, already valuable, especially in the possession of Dr. Johnston's specimens, has recently been materially augmented by the addition of numerous Australian and other forms, many of them new, procured by Mr. J. Macgillivray, on the voyage of H.M.S. Rattlesnake. It has also been much enriched by the liberality of Charles Darwin, Esq., F.R.S., Dr. J. Hooker, F.R.S., Dr. Lyall, R.N., R. M'Andrew, Esq., F.R.S., J. S. Bowerbank, Esq., F.R.S., The Rev. David Landsborough, Mrs. Gatty, Miss Cutler, Professor Edward Forbes, F.R.S., Dr. Greville, J. Hyndman, Esq., Joshua Alder, Esq., Dr. W. Stanger, the late W. Thompson, Esq., of Belfast, and others, who have

placed their collections at Mr. Busk's disposal, for the purposes of this Catalogue, and for the selection of the specimens required for the Museum Collection.

The Catalogue has been prepared, and the drawings made, by Mr. GEORGE BUSK, F.R.S., who has also superintended the execution of the lithography. The magnified figures have in all cases been taken from nature, and for the most part from specimens preserved in fluid, in order to ensure a more natural aspect than that afforded by dried specimens. As they have been drawn with the aid of the camera lucida, and to a scale which is given with each plate or figure, the absolute and relative proportions of the different objects will be at once obvious.

JOHN EDWARD GRAY.

1 Dec. 1853.

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CATALOGUE

OF

MARINE POLYZOA.

Fam. 10. MEMBRANIPORIDÆ.

Char. Polyzoary membranaceo-calcareous or calcareous, expanded, encrusting, sometimes foliaceous, contorted and suberect. Cells horizontal, quincuncial or serial.

Flustra, *Linn.*
Flustradæ, *Gray, Cat. B. M.* 145, 1848.
Celleporidæ (part.), *Johnston, Brit. Zooph.* ed. 2. p. 263.

SYNOPSIS OF GENERA.

* *Cells more or less open in front, with raised margins.*

1. MEMBRANIPORA.

** *Cells disposed in a radiate manner; closed in front.*

2. LEPRALIA.

1. Membranipora.

Polyzoary encrusting or suberect, foliaceous and contorted, spreading irregularly. Cells more or less irregularly disposed or quincuncial, with raised margins; a greater or less extent of the front membranaceous and flexible.

Eschara (part.), *Pallas*, *Elench.*
Flustra, *Linn.*, *Müller*, *Esper*, *Berkeley*, *Lamarck* (part.), *Grant*, *Fleming* (part.), *Risso*, *Johnston*, *Transact. Newc. Soc.* ii. *Lamouroux*, *Hist. d. Pol.* p. 96 (part.).
Membranipora, *Johnston*, *B. Z.*; *W. Thompson*; *Hassall.*
Discopora (part.), *Lamarck*, *An. s. V.* ii. 248, 1836.
Annulipora, *Gray*, *App. B. R.*
Conopeum, *Gray*, *App. B. R.*
Callopora, *Gray*, *App. B. R.*
Amphiblestrum, *Gray*, *App. B. R.*
Micropora, *Gray*, *App. B. R.*

1. Membranipora membranacea. Pl. LXVIII. fig. 2.

Cells oblong, with a short blunt spine at each upper angle.

Flustra membranacea, *Linn. Syst.* 1301; *Fabric. Faun. Grœnl.* 437; *Müller*, *Zool. Dan. Prod.* 253; *Ellis & Soland. Zooph.* 18; *Fleming*, *Brit. Anim.* 536; *Johnston in Trans. Newc. Soc.* ii. 265; *Blainville*, *Actinol.* 450; *Couch*, *Zooph. Cornw.* 55; *Corn. Faun.* iii. pl. 21. fig. 2; *O. Fabr. Faun. Grœnl.* p. 437. n. 446.
Flustra telacea, *Lam. Anim. s. Vert.* ed. 2. ii. 223 (not F. memb. p. 225).
Membranipora membranacea, *Blainv. Actin.* 447.
Hab. European Seas: common, spreading on fucus, sometimes suberect or free.

2. Membranipora pilosa. Pl. LXXI.

Cell prolonged below. A movable spine or vibraculum below the lower margin of the aperture, sometimes aborted; an irregular number of marginal spines. Wall of cell cribriform.

Irregular spongy foliaceous Coralline, *Ellis*, *Corall.* 73. no. 4. pl. 31.
Eschara pilosa, *Pallas*, *Elench.* 50; *Moll*, *Seerinde*, p. 41. pl. 1 & 2. figs. 5 & 6.
Flustra pilosa, *Linn. Syst.* 1301; *Müll. Zool. Dan. Prod.* 253; *Ellis and Soland. Zooph.* 13; *Esper*, *Pflanz. Flust.* t. 4. figs. 1, 2; *Berk. Syn.* i. 214; *Lamk. Anim. s. Vert.* ii. 159, ed. 2. ii. 224; *Blainv. Dict. Sc. Nat.* lx. 415; *Grant*, *Edin. New Phil. Journ.* iii. 111; *Flem. Brit. Anim.* 537; *Risso*, *L'Europ. Mérid.*

v. 335; *Johnst. Trans. Newc. Soc.* ii. 265. pl. 9. fig. 5; *Lister, Phil. Trans.* 1834, 384. pl. 12. fig. 2; *Templeton, Mag. Nat. Hist.* ix. 469.

Membranipora pilosa, *Johnst. Brit. Zooph.* 280. pl. 34. figs. 10–12; *Couch, Corn. Faun.* iii. 119; *Van Beneden, Recherch.* 53. figs. 1–10; *Johnst. Hist. Brit. Zooph.* ed. 2. 327. t. 56. fig. 6.

Flustra dentata, *Ellis and Soland. Zooph.* 15; *Turt. Brit. Faun.* 209; *Lamk. Hist. Anim. s. Vert.* ii. 158, ed. 2. ii. 224; *Templeton, Mag. Nat. Hist.* ix. 469.

Flustra lineata, *Esper, Pflanz. Flust.* t. 6 (? not good).

Membranipora pilosa, *Farre, Phil. Trans.* 1837, 412. t. 27. figs. 1–5.

Membranipora pilosa var. *β*, *Johnst. Brit. Zooph.* 327.

Eschara millepora, *Ellis, Corall.* t. 29. fig. D; *Ellis, Phil. Trans. abridg.* x. 492. t. 12. fig. 4 D.

Membranipora stellata, *W. Thompson, Ann. Nat. Hist.* v. 101; *Hassall, Ann. Nat. Hist.* vii. 369.

Annulipora pilosa, *Gray, List Brit. Rad.* p. 107.

Annulipora dentata, *Gray, List Brit. Rad.* p. 107.

Hab. European Seas; on Laminariæ and many other sea-weeds, very common.

When encrusting very slender fuci, it much resembles the *Electra verticillata* of Lamouroux, *H. d. Polypes*, p. 120; and is *F. pilosa, var. γ. reaumuriana* of Moll. (*l. c.* p. 46. fig. 6 A–H).

3. MEMBRANIPORA CORIACEA. Pl. LXXIII. figs. 4, 5.

Front of cells broadly elliptical; margin elevated into a small tuberosity on each side of the base of the mouth. Anterior surface punctate. Ovicells with a projection in front.

Flustra coriacea, *Esper, Pflanz. Flust.* t. 7. fig. 2; *Johnst. Hist. Brit. Zooph.* ed. 2. p. 349. t. 56. fig. 8.

Discopora coriacea, *Lamk. Hist.* ed. 2. ii. 251; *Lamx. Encyc.* 255; *Blainv. Dict. Sc. Nat.* lx. 411; *Man. Act.* 446.

Micropora coriacea, *Gray, List Brit. Rad.* p. 115.

Hab. European Seas; encrusting shells.

4. MEMBRANIPORA UMBONATA. Pl. LXXIII. figs. 6, 7.

Front of cell broadly elliptical; margin scarcely raised. A spine on each side of the mouth. A projecting avicularium on the front of the cell.

Hab. Van Diemen's Land; on fucus. *Mrs. Smith, from W. Thompson.*

The very prominent umbonate avicularium on the front of the cell suffices to distinguish this species of *Membranipora*. The

figure in Plate LXXIII. is not good, as it is drawn from a specimen apparently without the oral spines, which usually exist in and are in fact a prominent characteristic of the species. The margin of the cells is scarcely raised, except in the older ones in the centre of a patch, and the disposition towards a radiating arrangement of the cells approximates this species, perhaps too closely, to *Lepralia*.

5. MEMBRANIPORA LINEATA. Pl. LXI. fig. 1.

Cells oval, separate, the margin armed with numerous slender spines, erect or bent inwards.

Flustra lineata, *Linn. Syst.* 1301; *Müll. Zool. Dan. Prod.* 253; *Fabr. Faun. Grœnl.* 437; *Jameson, Wern. Mem.* i. 563; *Couch, Zooph. Cornw.* 55; *Corn. Faun.* iii. 124; *W. Thompson, Ann. Nat. Hist.* v. 253; *Johnst. Hist. Brit. Zooph.* ed. 2. p. 349. t. 66. fig. 4, & p. 350.

Flustra spinifera, *Johnst. Trans. Newc. Soc.* ii. 266. pl. 9. fig. 6.

Flustra hirta, *Lamour. Corall.* 111; *Bosc, Vers,* iii. 119; *Risso, L'Europ. Mérid.* v. 334.

Callopora lineata, *Gray, List Brit. Rad.* p. 109.

Hab. European Seas; common; and according to Lamouroux it also occurs in Greenland, on stones, shells and fuci.

Although some forms of *Lep. nitida* occasionally present a considerable resemblance to this species, there can be no doubt of their being perfectly distinct.

6. MEMBRANIPORA FLEMINGII. Pl. LXI. fig. 2. Pl. LXXXIV. figs. 4, 5, 6. Pl. CIV. figs. 2, 3, 4.

Front of cell ovate, very broad below; margin thick, granular; front of cell partially filled in by a calcareous, granular expansion. A projecting avicularium on each side below the margin of the aperture, or sometimes one, in the centre; 0-2-7 spines on the upper margin of aperture. Ovicell galeate.

Flustra membranacea, *Müll. Zool. Dan. Prod.* 253. no. 3054; *Zool. Dan.* iii. 63. t. 117. figs. 1, 2; *Fabr. Faun. Grœnl.* 437; *Lamour. Corall.* 47; *M.-Edw. Lamk. Hist.* ed. 2. ii. 225; *Blainv. Man. Act.* 450.

Membranipora membranacea, *Johnst. Hist. Brit. Zooph.* ed. 2. p. 328. t. 56. fig. 7, & p. 478; not *Blainv. Dict. Sc. Nat.* 412.

Flustra unicornis, *Flem. Edin. Phil. Journ.* ii. 87; *Flem. Brit. Anim.* 236; *Blainv. Act.* 450; *Johnst. Tr. Newc. Soc.* ii. 266.

Membranipora unicornis, *Blainv. D. S. N.* lx. 412; *Man. Act.* 447.

Flustra tuberculata, *Johnst. Br. Zooph.* 289; *Bosc, Vers,* iii. 143.

Flustra Peachii, *Couch, Rep. Cornw. Polytechnic Soc.* 81 (see *Johnst. Brit. Zooph.* 478).
Amphiblestrum membranaceum, *Gray, List B. R.* 110.
Hab. European Seas; Australia?: on stones and shells.

The above synonyms are assigned to this species chiefly on the authority of Dr. Johnston, but several of them are probably erroneous. No species presents greater diversities of form than the present; and specimens will occasionally be met with, especially from deep water, in which, from the almost entire absence of the spines and avicularia, great difficulty will be experienced in the determination; careful inspection, however, of various parts of the patch, especially at the growing edge, if it be in the growing state, will usually suffice to trace its relationship to the form assumed as the type of the species. The figures given in the different plates referred to, afford but a faint notion of the endless varieties induced by age, wear and situation, particularly as to depth, of this protean form. I have ventured to assign a new term to it, because the specific name '*membranacea*' belongs, as I think, of priority, to another species; and Dr. Fleming's name, '*unicornis*,' is so inapplicable that its retention seems scarcely justifiable.

7. Membranipora Rozieri. Pl. LXV. fig. 6.

Front of cell elliptical; mouth orbicular, with a raised margin and small tuberosity on each side; an oval or elongated opening on each side of the front of the cell immediately below the mouth. Ovicell globose, carinate in front.

Flustra Rozieri, *Audouin, Savigny, Egypt.* pl. 8. fig. 9.
Hab. Rio de Janeiro, *Darwin.* On fucus.

Notwithstanding the above habitat, from which only have I seen a specimen, collected by Mr. Darwin, there can be no doubt of the identity of the form with that so beautifully figured by Savigny.

8. Membranipora Rosselii. Pl. C. fig. 2.

Front of cells oval, wide, or elongated; the lower half of the area filled in by a calcareous granulated expansion; margin finely beaded. Ovicell flattened in front.

Flustra Rosselii, *Audouin, Expl.* 240; *Savigny, Egypt.* pl. 10. fig. 11.
Hab. Orkney. Coast of Devon (Start)?, *Bowerbank.* Bay of Gibraltar, *M'Andrew, Landsborough.*

9. MEMBRANIPORA CALPENSIS, n. sp.? Pl. CIV. figs. 5, 6.

Front of cell oval, elongated; margins elevated, smooth; anterior surface of cell punctate.

Hab. Bay of Gibraltar, *M'Andrew, Landsborough.* Egean Sea, *E. Forbes.* On fuci, shells and stones, and sometimes scarcely attached to anything.

A fine and, apparently, abundant species which I am unable positively to reconcile with any published description, and therefore venture to assign a name to. It seems at present to be confined to the Mediterranean, but no figure at all approaching it occurs among those of Savigny, unless it be that of *Flustra Latreillei*, pl. 14. fig. 8.

10. MEMBRANIPORA STENOSTOMA, n. s. Pl. C. fig. 1.

Front of cell pyriform; margins elevated, smooth, not grooved; surface of cell smooth, or subgranular, a long spine on each side of the mouth, which is very narrow. Avicularia scattered over the polyzoary; mandible triangular acute.

Hab. Tasmania, *Mrs. Smith* (*W. Thompson*). East Falkland Islands, 4 to 10 fathoms, *Darwin.*

11. MEMBRANIPORA CERVICORNIS, n. s. Pl. C. fig. 3.

Front of cell oblong or oval; a strong and much-projecting process arising from each upper angle of the aperture, branching like a stag's horn and bending over the front of the cell, usually meeting and inosculating; several other simple or forked, marginal spines. Ovicell galeate, crowned with a small avicularium?

Hab. ——?

This very curious species is at once distinguishable by the processes on each side of the upper part of the cell, which, projecting at a right angle, branch out in the manner of the antlers of a stag, and usually uniting in front by one or more of the branches, cover and protect the open front of the cell in a very effectual manner. The colour of the polyzoary is purplish.

12. MEMBRANIPORA LACROIXII. Pl. LXIX. Pl. CIV. fig. 1.

Front of cell oval, either entirely occupied by a membrane, or partially filled in by a calcareous, granulated expansion all round the circumference, but wider inferiorly; margin granulated; usually an avicularium on either side below the aperture, and occasionally a marginal spine (usually obsolete or worn off) on each side above.

Flustra distans, *Hassall, Ann. Nat. Hist.* vii. 369; *Johnst. Brit. Zooph.* 350. pl. 57. figs. 11, 12.
? Flustra hibernica, *Hassall, Ann. & Mag. Nat. Hist.* vi. 172. t. 7. fig. 1; vii. 370.
? Lepralia pedilostoma, part., *Johnst. Brit. Zooph.* 315.
Membranipora membranacea ?, *Johnst. Brit. Zooph.* 350.
Flustra Peachii, *Couch, 9th Rep. Cornw. Polyt. Soc.* 81.
Flustra Lacroixii, *Savigny, Egypt.* t. 10. fig. 9.
Flustra Savartii, *Aud. Exp.* i. 240; *Savigny, Egypt.* t. 10. fig. 10.
Membranipora Peachii, *Couch, Corn. Faun.* iii. 120. t. 22. fig. 13.
Conopeum reticulum, *Gray, List Brit. Rad.* p. 108.
Hab. European Seas, common, spreading like a network over stones and dead shells. It occurs (?) also in Australia.

This species, the identity of which with the *Millepora reticulum* of Esper may be doubted, and which is certainly distinct from what is described as *Discopora reticulum* in Lamarck (*Hist.* ii. 250. ed. 2), and probably therefore from the *Membranipora reticulum* of Blainville (*Man. d'Actinol.* 447), is indubitably the same with *Flustra Lacroixii*, Audouin, and apparently also with the succeeding figure of *F. Savartii*; and I have therefore, in the uncertainty of the older appellation of Esper, and at the same time to avoid confusion with those of Lamarck and Blainville, adopted that of Audouin, as the next in order of time, to the exclusion of Dr. Hassall's name of *F. distans*, and Mr. Couch's of *F. Peachii*, both of which doubtless refer to one and the same species.

13. MEMBRANIPORA CYCLOPS, n. s. Pl. LXV. fig. 3.

Front of cells oval; margin very much raised, beaded; a single avicularium below the aperture.

Hab. New Zealand. On fucus.

Very much like the preceding, but differing in the single instead of two avicularia below the aperture.

14. MEMBRANIPORA MONOSTACHYS, n. s. Pl. LXX.

Cells distant in the younger portions of the polyzoary, attenuated downwards, and disposed more or less in linear series. Aperture oval; margin thin, beaded or granular, a single acuminate submarginal spine below the aperture. Scattered avicularia over the polyzoary.

Hab. Britain (east coast?). In the mouths of rivers and estuaries, or in brackish water, spreading upon shells and stones, sometimes erect, free, foliaceous and contorted.

This species, which has probably been confounded with *M.*

Lacroixii, to which, in the older state especially, it bears an extremely close resemblance, seems nevertheless to me to be quite distinct. It usually forms a delicate gauze-like coat upon shells and stones, and is then quite calcareous, though very delicate and thin; but it also occurs in a more membranaceous condition and growing in an irregular foliaceous form of a greenish colour (dry). The only specimen of this sort that has come under my notice was kindly furnished by Dr. Landsborough; it was found by Mr. Higham of Norwich in brackish water and in considerably sized masses. It can hardly, perhaps, be regarded as purely a marine form, and will be found I imagine more abundantly in rivers near the sea, or in shallow estuaries, than in the sea itself. It occurs in great plenty on shells and stones on the muddy bottom of the river Deben in Suffolk. I have also a specimen very like this species from St. Vincent, one of the Cape de Verde Islands.

15. MEMBRANIPORA MAGNILABRIS, n. s. Pl. LXV. fig. 4.

Front of cell oval; upper margin semicircular, much raised; moveable lip very large, occupying the entire semicircular upper third of the front of the cell, remainder of the front of cell depressed, membranous or semicalcareous, punctured.

Hab. Abrolhos Islet (Atlantic), *Darwin*. Algoa Bay, *Bowerbank*. On shell.

Very remarkable for the large size of the cells and the very great dimensions of the moveable lip; this part, as usual, is composed of a semicircular rim of horny matter; but besides this, the membrane stretching across the semicircle is further supported by two slender bars of horny substance, which extend from the side of the base to the centre of the bow, where they meet. This species might be regarded as the type of the cheilostomatous Polyzoa, and from its comparatively large size would probably be an interesting subject for examination in the living state.

16. MEMBRANIPORA GALEATA, n. s. Pl. LXV. fig. 5.

Front of cell oval; two pointed marginal spines on each side, towards the top. Ovicell galeate, widely open beneath, crowned with a large oblong avicularium.

Hab. East Falkland Islands, 4 to 10 fathoms, *Darwin*. On Laminaria.

Colour dark purple.

2. Lepralia.

Polyzoarium adnate, crustaceous, spreading from a centre in a more or less circular form; composed of contiguous or connected, calcareous, decumbent cells, the walls of which are complete in front.

Eschara (sp.), *Moll, Seerinde*; *Pallas, Elench.*
Lepralia, *Johnst. Brit. Zooph.* ed. 2. p. 300; *Gray, List Brit. Rad.* p. 148 (part.).
Berenicea, *Flem. Brit. An.* 533, 1828; not *Lamx. Exp.* 80, 1821; nor *Peron.*
Escharina, sp., *M.-Edw. Lamk. Hist.* ed. 2. ii. 230; *Gray, App.* p. 148.
Escharoide, sp., *M.-Edw. Lamk. Hist.* ed. 2. ii. 259?
Cellepora, sp., *Oken, Lehrb. Nat.* 86, 1815; *Audouin, Expl. Savigny, Egypt.* (part.); *Lamouroux* (part.); *Hayenow* (part.).
Flustra, *id. ib.*; *Lamouroux* (part.).
Discopora, *Lamarck, Hist.* (part.); *Gray, App.* p. 148 (part.); *Lamouroux, Exp. Méth.* (part.)
Cribrillina, Herentia, Escharella, Porella, Celleporella (all spec.), *Gray, App. List Brit. Rad.* pp. 147, 148, 149.

The very great number of species included under the above generic definition renders some subdivision of them indispensably requisite for the convenient determination of any particular form. In the absence of more precise knowledge respecting the living animals, we are not, I conceive, at present in a condition to propose a satisfactory natural arrangement, and the following disposition of the species therefore must only be regarded as artificial and contrived solely for the purpose of convenient reference.

Synopsis *of the Species of* Lepralia.

1. *Armatæ.* Species provided with either avicularia or vibracula.

A. Species having avicularia.

a. Median and single.

* Superior (above the mouth).

Page
1. L. Brongniartii 65

** Inferior (below the mouth).

2. L. Landsborovii..... 66
3. L. galeata 66
4. L. reticulata 66
5. L. marionensis 67

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6. L. auriculata 67
7. L. concinna 67
8. L. verrucosa 68
9. L. violacea..... 69

β. Avicularia double, or azygous and lateral; on each cell, or irregularly distributed throughout the polyzoary.

10. L. spinifera 69
11. L. trispinosa 70
12. L. coccinea..... 70
13. L. linearis 71
14. L. alata 71
15. L. monoceros..... 72
16. L. bicristata 72
17. L. margaritifera..... 72
(L. punctata (subinde)).

B. Species having vibracula.

18. L. ciliata 73
19. L. Gattyæ 73
20. L. Hyndmanni 74
21. L. personata 74
22. L. depressa 75
23. L. Lyallii 75

2. *Inarmatæ*. Species without either avicularia or vibracula.

a. With oral spines.

24. L. variolosa 75
25. L. nitida..... 76
26. L. annulata 76
27. L. bispinosa 77
28. L. Peachii 77
29. L. ventricosa..... 78
30. L. melolontha 78
31. L. innominata 79
32. L. punctata 79
(L. Malusii (subinde)).

β. With the mouth unarmed.

33. L. figularis..... 80
34. L. pertusa 80
35. L. pallasiana..... 81
36. L. cucullata 81

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37. L. labiosa 82
38. L. labrosa 82
39. L. simplex 82
40. L. areolata 82
41. L. adpressa 82
42. L. Malusii 83
43. L. granifera 83
44. L. hyalina 84
45. L. discreta 85
46. L. annularis 85

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1. Armatæ.

A. *With avicularia.*

a. Median and single.

* *Superior.*

1. LEPRALIA BRONGNIARTII. Pl. LXXXI. figs. 1, 2, 3, 4, 5.

Cells ovate, smooth, or transversely ringed, distinct, or separated by reticulated spaces; mouth circular; each cell with an avicularium at the summit above the mouth. Ovicell pyramidal, carinate in front, crowned by an avicularium.

Cellepora Brongniartii, *Aud. Expl.* i. 240, *from Savig. Egypt. Polyp.* t. 10. fig. 6.
Lepralia tenuis, *Hassall, Ann. & Mag. Nat. Hist.* vii. 412; *Johnst. Hist. Brit. Zooph.* ed. 2. p. 303. t. 54. fig. 2.
Lepralia catenata, *Peach, MSS.*
Lepralia assimilis, *Johnst. Hist. Brit. Zooph.* ed. 2. p. 304; *Gray, List Brit. Rad.* p. 117.
Lepralia Jacotini, *Gray, List Brit. Rad.* p. 117.
Hab. Britain: common on shells, stones and fuci. Ayrshire, *Dr. Landsborough.* Ireland, *W. Thompson.*

A very curious and interesting form, and one subject to great variety according to age and depth. It is remarkable for the number of avicularia with which the polyzoary is furnished. Besides the avicularium at the summit of each cell, or nearly so, or at that of the ovicell when it exists, the interspaces between the cells are studded with innumerable minute organs of the same

kind, as will be apparent in fig. 1. Pl. LXXXI. There is often a prominent process beneath the mouth and projecting over it, as shown in fig. 5, which represents the form I believe described by Dr. Hassall under the name of *L. assimilis*. Another peculiarity of this species is the extraordinary difference of dimensions exhibited in the cells of different specimens. The cells in Plate LXXXI. are all drawn to the same scale.

** *Avicularium inferior, or below the mouth.*

2. LEPRALIA LANDSBOROVII. Pl. LXXXVI. fig. 1.

Cells ovate, coalescent, separated by raised lines; surface granular; mouth raised, circular, with a large and wide spout-like sinus below, within which is an avicularium?

Lepralia Landsborovii, *Johnst. Hist. Brit. Zooph.* ed. 2. p. 310. t. 54. fig. 9; *Gray, List Brit. Rad.* p. 119.

Hab. Coast of Ayrshire, *Landsborough*. On *Pecten opercularis*.

The only specimen I have seen, or of which I can hear, is the one in the British Museum Collection. This gives the idea of an old or imperfect condition, and consequently the characters above assigned, and perhaps the species itself, may be regarded as only provisionally retained.

3. LEPRALIA GALEATA, n. s. Pl. XCIV. figs. 1, 2.

Cells ovato-ventricose, punctured all over; mouth orbicular, entire, unarmed; an avicularium immediately below the mouth; mandible oval. Ovicell globose, punctured.

Hab. Falkland Islands, T. del Fuego, *Darwin*. On fucus and shell.

4. LEPRALIA RETICULATA. Pl. XC. fig. 1. Pl. XCIII. figs. 1, 2. Pl. CII. fig. 1.

Cells ovate-elongated; interspaces punctured; mouth raised, with a thin margin and a channelled sinus in the lower lip, two to three spines on the upper margin; a central avicularium immediately below the mouth; mandible acute. Ovicell globular, punctured, its opening bounded below by the meeting of its sides above the avicularium.

Lepralia reticulata, *J. Macgillivray, Ann. & Mag. Nat. Hist.* ix. 467; *Johnst. Hist. Brit. Zooph.* ed. 2. p. 317. t. 55. fig. 10; *Gray, List Brit. Rad.* p. 120.

? Flustra Montferrandii, *Audouin, Expl.* i. 240; *Savigny*, pl. 9. fig. 14.

Hab. Britain (south coast?): abundant on *Eschara foliacea*. Budleigh Salterton, Devon, *Miss Cutler*. Coast of Norfolk, *Lieut. Thomas*. Jersey, *Mrs. Gatty*. Egean Sea, *E. Forbes*. Copeland Islands, Bay of Belfast, deep water, *W. Thompson*. New Zealand, *Dr. Lyall*. (Pl. CII. fig. 1.)

The drawing in Plate XC. was made from a bad specimen and does not show the spines, which usually appear to exist only on the marginal cells.

5. LEPRALIA MARIONENSIS, n. s. Pl. XCVI. figs. 1, 2.

Cells ovate, distinct, punctured; mouth orbicular, a little raised above; in front of the lower lip a large avicularium, with a spoon-shaped mandible. Ovicell globose; surface granular; sides of the opening of the ovicell prolonged so as to enclose the avicularium.

Hab. Marion Islands, 80 fathoms, *Dr. Hooker*.

6. LEPRALIA AURICULATA. Pl. LXXXIX. figs. 4, 5, 6.

Cells subovate or rhomboidal, usually quite immersed, and disposed in linear series, frequently punctured, especially round the margin; separated from each other by raised lines; mouth orbicular, with a shallow sinus below; two to three oral spines; a minute avicularium on an eminence immediately below the sinus of the lower lip; mandible crescentic. Ovicell subglobose, depressed, usually immersed, punctured.

Lepralia auriculata, *Hassall, Ann. & Mag. Nat. Hist.* ix. 412; *Johnst. Hist. Brit. Zooph.* ed. 2. p. 310. t. 54. fig. 8; *Gray, List Brit. Rad.* p. 119.

Hab. Orkney, *Lieut. Thomas, R.N.* Belfast Bay, *W. Thompson*. Coast of Suffolk, *G. B.* Isle of Wight, *id.* Egean Sea, *E. Forbes* (var.). ? E. Falkland Islands, 4–10 fathoms, *Darwin*. Bray, Burnham, Norfolk, *Hassall*. Scilly, *M'Andrew*. On shell.

Attention to the position and form of the avicularia will at once suffice to distinguish *L. linearis, auriculata* and *trispinosa*; species, as Dr. Johnston observes, very closely allied in general habit.

7. LEPRALIA CONCINNA, n. s. Pl. XCIX.

Cells oval, rounded, or rhomboid in outline when deeply im-

mersed; mouth rounded, immersed or level (never raised); a minute avicularium with semicircular or rounded mandible on or within the middle of the lower lip, which sometimes projects into a rostrum. Ovicell small, deeply immersed, inconspicuous, not punctated.

Hab. Copeland Islands, Belfast Bay, deep water, on shell and stone, *W. Thompson.* Belfast Bay, 20–25 fathoms, on shell, *id.*

Forms an elegant close covering to stones and shells. The species appears to have been hitherto undistinguished, having apparently been confounded with *L. immersa* or *trispinosa*, Johnst., *L. variolosa*, &c., but it is clearly distinct and readily characterized by the mouth, which is never raised, and usually, in the older portions of the patch, deeply immersed; its form is wide above and contracted below, but without the sinus of *L. reticulata* and *trispinosa*; nor is it furnished with any spines; and the central avicularium on the lower lip is within, or at all events immediately on, or forming part of the margin of the mouth, and not a little below it as in *L. reticulata*, in which species, moreover the mandible is acute. From *L. auriculata* also it differs in the absence of oral spines.

8. LEPRALIA VERRUCOSA. Pl. LXXXVII. figs. 3,4. Pl. XCIV. fig. 6.

Cells immersed at the base, ventricose, front rising into a strong pyramidal rostrum or umbo, from which ridges radiate towards the sides and bottom; surface usually verrucose; mouth orbicular, upper margin deeply immersed, sometimes rising on each side into a blunt tooth-like process, and sinuous in front, sometimes quite plain; an avicularium with semicircular mandibles on the upper side of the rostrum or umbo. Ovicells ——?

? Cellepora verrucosa, *Esper, Cellep.* t. 2. figs. 1, 2; not Discopora verrucosa, *Lamk. Hist.* ii. 164, ed. 2. ii. 248.
? Lepralia Johnstoni, *Bean, MSS.*
Lepralia verrucosa, *W. Thompson, Ann. Nat. Hist.* xiii. 441; *Johnst. Hist. Brit. Zooph.* ed. 2. p. 316. t. 56. fig. 3.
Lepralia reticulata, *Couch, Corn. Faun.* iii. 117. pl. 22. fig. 9.
Discopora verrucosa, *Gray, List Brit. Rad.* p. 126.
Hab. Scarborough, *Bean.* Scotland (Ayrshire?), *Dr. Landsborough.*

The avicularium on the upper side of the projecting rostrum or umbo is to a great degree concealed by that process in front, but will be observed if the specimen be turned in such a direction that a view of the upper side of the projection is obtained.

9. LEPRALIA VIOLACEA. Pl. LXXXVII. figs. 1, 2. Pl. CX. fig. 1 (var. *cruenta*).

Cells ovate or pyriform, surface uneven; mouth suborbicular; an avicularium immediately below the middle of the lower lip, with an acute mandible pointing upwards, and in the centre of the front of the cell a perforation? or depression.

Lepralia violacea, *Johnst. Hist. Brit. Zooph.* ed. 2. p. 325. t. 57. fig. 9.
Escharella violacea, *Gray, List Brit. Rad.* p. 125.
Hab. Isle of Man, *E. Forbes.* Cornwall, *C. W. Peach.* Bay of Gibraltar, *M'Andrew, Dr. Landsborough.* Orkney?, *Dr. Greville.*

Colour blue or purple, sometimes very deep: like many other *Lepraliæ* it is liable to be much overgrown or thickened, but in any state it may be recognized by the depressions left by, or the vestiges of the suboral avicularium and the central hollow. Specimens in this condition I have received from Dr. Greville, collected in the Orkneys, remarkable for the great thickening of the cell-wall and their deep purple or rather crimson colour.

β. Avicularia either double, or if single, on one side of the cell; on every cell, or irregularly distributed on the polyzoary.

10. LEPRALIA SPINIFERA. Pl. LXXVI. figs. 2, 3. Pl. LXXX. figs. 4, 5, 6, 7. Pl. LXXXI. figs. 6, 7. Pl. XCI. figs. 1, 2.

Cells ovate, ventricose, surface punctate or granular; usually a central umbo in front, upon which is occasionally articulated a long spine; often a raised avicularium on each side at the top of the cell close to the mouth; mouth with a narrow sinus in the lower lip, and three to eight marginal spines (often wanting). Ovicell globose, with grooves radiating from the centre.

? Eschara spongites, *Moll, Seerinde*, p. 37. pl. 1. fig. 3.
Lepralia ciliata, *Hassall, Ann. & Mag. Nat. Hist.* vi. 171, & vii. 367. pl. 9. fig. 2.
Lepralia spinifera, *Johnst. Hist. Brit. Zooph.* i. 324. pl. 57. fig. 6; *Gray, List Brit. Rad.* p. 122.
Lepralia unicornis, *Johnst.* (*op. cit.* p. 320. pl. 57. fig. 1.)
Berenicea coccinea, *Johnst. Trans. Newc. Soc.* ii. 267. pl. 12. fig. 5.
Lepralia coccinea, *Johnst. Brit. Zooph.* 278. pl. 34. figs. 1–3; *Hassall, Ann. & Mag. Nat. Hist.* vii. 367; *Couch, Corn. Faun.* iii. 115; *W. Thompson, Ann. Nat. Hist.* v. 253.

Escharina unicornis, *Gray*, *l. c.* p. 124.
Hab. Isle of Wight, *G. B.* Coast of Devon, *Miss Cutler.* Bay of Gibraltar, *Landsborough*, *M'Andrew.* ? Port Natal, *W. Stanger.* On fuci and shells.

From the comparison of numerous specimens in all forms and stages, I feel satisfied of the identity of *L. spinifera* (Hassall) and *L. unicornis* (Johnston). The peculiar sculpture of the ovicell, conjoined with the sinus in the lower lip and the lateral avicularia, are sufficiently characteristic, without the often-wanting central umbo and articulated spine.

11. LEPRALIA TRISPINOSA. Pl. LXXXV. figs. 1, 2. Pl. XCVIII. Pl. CII. fig. 2.

Cells ovate, usually punctured round the edge; mouth raised, with a thin border, lower lip forming a sinuous spout, two or three spines above; occasionally an avicularium on the side of the cell; mandible acute, pointing upwards and outwards.

Discopora trispinosa, *Johnst. Edinb. Phil. Journ.* xiii. 322.
Berenicea trispinosa, *Johnst. Trans. Newc. Soc.* ii. 268.
Lepralia trispinosa, *Johnst. Brit. Zooph.* p. 280. pl. 34. fig. 5; *Couch, Corn. Faun.* iii. 118; *J. Macgillivray, Ann. & Mag. Nat. Hist.* ix. 467; *Johnst. Hist. B. Z.* ed. 2. p. 324. t. 57. fig. 7; *Gray, List Brit. Rad.* p. 122.
Lepralia variolosa, var. *a*, *Johnst. Brit. Zooph.* ii. 317. pl. 55. fig. 8.
Var. *a*. With a rostrum below the mouth.
Hab. Coast of England, Scotland and Ireland, common. Cape Horn, 40 fathoms, *Darwin.*

Notwithstanding the great diversity in aspect of different specimens, the characters above given will in most cases be recognized in one part or another of the polyzoary, and will suffice to distinguish the species from those with which it has apparently been confounded, viz. *L. variolosa, concinna,* and *L. Peachii* (*L. immersa,* Johnst.).

12. LEPRALIA COCCINEA. Pl. LXXXVIII.

Cells oval or shortly cylindrical; mouth with a central mucro on the lower lip and two lateral teeth; several (six) spines above; an avicularium on each side close to the mouth. Ovicell globular, surface granular.

Cellepora coccinea, *Abildgaard, Müll. Zool. Dan.* iv. 30. t. 146. figs. 1, 2; *Lamk. Anim. s. Vert.* ed. 2. ii. 259.

Berenicea coccinea, *Flem. Brit. Anim.* p. 533; *Johnst. Edin. Phil. Journ.* xiii. 222.

Lepralia coccinea, *Johnst. Hist. Brit. Zooph.* ed. 2. p. 322. t. 57. figs. 2, 3.

Lepralia tridentata, *Couch, Corn. Faun.* p. 115. pl. 22. fig. 5.

Var. β. With a triangular slit or loop on each side of the aperture.

Lepralia appensa, *Hassall, Ann. & Mag. Nat. Hist.* vii. 367. pl. 9. fig. 3.

Lepralia ansata, *Johnst. Hist. Brit. Zooph.* ed. 2. p. 307. t. 54. fig. 12.

Lepralia Ballii, *Johnst. Hist. Brit. Zooph.* ed. 2. p. 321. t. 56. fig. 5.

Escharina coccinea, Ballii, ansata, *Gray, List Brit. Rad.* p. 124.

Hab. Portaferry, Ireland; Belfast Bay; Isle of Wight, *W. Thompson.* Start Point, *J. S. Bowerbank.* Sidmouth, *Mrs. Gatty.* Coast of Ayrshire, *Landsborough.* Isle of Man, *E. Forbes.* Cornwall, *C. Peach.* St. Andrews, *Prof. Reid.* Falmouth, *Cocks.* Off the Tees, *Lieut. Thomas, R.N.* On stones and shells, &c.

Comparison of the various figures will suffice to show the identity of all these forms. This species is one of those which undergoes a remarkable change in deep water, becoming very strong and thick, and the spines are often worn off.

13. Lepralia linearis. Pl. LXXXIX. figs. 1, 2, 3.

Cells completely immersed, much depressed, rhomboidal or subovate, disposed in linear series, and separated from each other by a raised line; mouth orbicular, with a sinus below; two to three oral spines; a small avicularium on a rounded mamillary eminence on either side of the cell in front, sometimes single and central; mandible acute, triangular. Ovicell globose, prominent, punctured.

Lepralia linearis, *Hassall, Ann. & Mag. Nat. Hist.* vii. 368. pl. 9. fig. 8; *Johnst. Hist. Brit. Zooph.* ed. 2. p. 308. t. 54. fig. 11.

Herentia linearis, *Gray, List Brit. Rad.* p. 123.

Hab. Start Point, *J. S. Bowerbank.* Coast of Suffolk, *G. B.* Orkney, *Barlee.* Beaufort Dyke, 110–147 fathoms, *Captain Beechey, R.N.* Roundstone, *W. Thompson.* Carrickfergus, *id.* Strangford Loch, *id.* Belfast Bay, 20 to 25 fathoms, *id.* Mediterranean, *M'Andrew.* East of Kingstown Harbour, and Giant's Causeway, *Hassall.* On shell.

14. Lepralia alata, n. s. Pl. LXXIX. fig. 3.

Cells immersed; outline oval or subrotund; front with grooves radiating to a central eminence or umbo; mouth suborbicular, with two to three spines above; a small avicularium on each side of the body about or below the middle, directed horizontally outwards.

Hab. Cape Horn, 40 fathoms, on pebble, *Darwin.*

Its nearest congener is *Lepralia verrucosa*; it is, however, much smaller, and distinguished by the lateral, alar avicularia. In the older state the appearance of the polyzoary is very confused, and the peculiar characters are only to be sought at the growing edge, and in the younger or more recent cells.

15. LEPRALIA MONOCEROS, n. s. Pl. XCIII. figs. 5, 6.

Cells immersed, outline more or less oval, broad above, pointed below; surface punctured; mouth narrow, transverse, a strong projecting rostrum on the lower margin; a very strong and long articulated spine on one side only of the mouth. Ovicell pyramidal, hollowed inferiorly in front, and often crowned with a small avicularium on the summit; numerous scattered avicularia of larger and smaller size on or between? the cells, throughout the polyzoary.

Hab. Straits of Magellan, 10 to 20 fathoms; Tierra del Fuego; Patagonia, 48° 56′ S. L., 19 fathoms; Falkland Islands, 4 to 10 fathoms; Cape Horn, 40 fathoms, *Darwin*. On stone and fuci.

A very peculiar and remarkable form, readily distinguishable by the enormous azygos spine on one side of the mouth, which appears to be articulated to a short basal joint by a constricted portion composed of cartilaginous or horny substance.

16. LEPRALIA BICRISTATA. Pl. XCIV. figs. 3, 4, 5.

Cells ovate, ventricose, punctured round the margin, with a central umbo perforated above; occasionally a small avicularium with a pointed mandible on one side of the cell near the top; mouth straight below, with four to six oral spines. Ovicell globose, with two raised keels running across it from side to side.

Hab. Cape Horn, 40 fathoms, *Darwin*.

17. LEPRALIA MARGARITIFERA. Pl. CI. figs. 5, 6.

Cells deeply immersed, outline marked by punctures; front of cell raised into an elevated umbo; mouth very large, nearly round, with a thickened margin; numerous larger and smaller oval avicularia dispersed all over the polyzoarium, usually one on the side of the mouth of each cell. Ovicell immersed, umbonate in front.

F. margaritifera, *Quoy & Gaimard, Voy. de l'Uranie*, pl. 92. figs. 7, 8.

Hab. Tierra del Fuego, on shell, *Darwin*.

B. *Species having vibracula.*

18. LEPRALIA CILIATA. Pl. LXXIV. figs. 1, 2. Pl. LXXVII. figs. 3, 4, 5.

Cells ovate or subglobose, surface granular, an elongated acuminate vibraculum on one side of the body; a semilunar pore frequently on an eminence in the middle of the front of the cell, above the centre; mouth with numerous (five to seven) spines; lower lip straight, entire. Ovicell globose, surface granular.

Eschara ciliata, var. β, *Pall. Elench.* 38.
Eschara vulgaris, var. β, *Moll, Seerinde*, p. 62. pl. 3. fig. 11.
Cellepora ciliata, *Linn. Syst.* 1286; *Fabr. Faun. Grœnl.* 434. no. 441.
Berenicea utriculata, *Flem. Brit. Anim.* 533.
Lepralia ciliata, *Johnst. Brit. Zooph.* 279. pl. 34. fig. 6; *Couch, Corn. Faun.* iii. 118. pl. 22. fig. 10; *W. Thompson, Ann. Nat. Hist.* v. 253; *J. Macgillivray, Ann. & Mag. Nat. Hist.* ix. 467; *Johnst. Hist. Brit. Zooph.* ed. 2. p. 323. pl. 57. figs. 4, 5; *Gray, List Brit. Rad.* p. 121.
Lepralia insignis, *Hassall, Ann. & Mag. Nat. Hist.* vii. 368. t. 9. fig. 5; *Couch, Corn. Faun.* t. 22. fig. 11; *J. Macgillivray, Ann. & Mag. Nat. Hist.* ix. 467.
Lepralia ciliata, var. β, *Johnst. Brit. Zooph.* ed. 2. p. 323.
Flustra Genisii, *Aud. Expl.* p. 239, *from Savig. Egypt. Rept.* t. 9. fig. 5.
Escharina vulgaris, part., *M.-Edw. Lamk. Hist.* ed. 2. 231?; *Gray, List Brit. Rad.* p. 123.
Hab. Britain (South Coast?); Mediterranean? *Savigny.* Belfast Bay, *W. T.* America, *Pallas*, non vidi. Beaufort Dyke, 110 to 145 fathoms, *Capt. Beechey.*

The spines are frequently wanting in old and worn, or perhaps deep water specimens. On careful inspection, however, the stumps of them may usually be observed, but the existence of the opening for the vibraculum on the side of the body, and the crescentic opening in the middle, will, together, always suffice, in every state, to distinguish the present from any other British form.

19. LEPRALIA GATTYÆ. Pl. LXXXIII. fig. 6.

Cells ovate, pointed inferiorly, raised in front or umbonate, punctate, with shallow radiating grooves; mouth rounded above, lower lip straight; five oral spines, the base of which is black; a slender vibraculum on each side at the top of the cell; a semilunar pore in front above the centre. Ovicells globose, punctured.

? F. coronata, *Aud.* i. 239. pl. 9. f. 6.
Lepralia Gattyæ, *Landsborough, Hist. Brit. Zooph.* pl. 18 fig. 71.
Hab. Sidmouth, *Mrs. Gatty.* On *Phyllophora rubens*, Jersey, *J. Alder.*

This very pretty species, to which my attention was first drawn by Mrs. Gatty, appears hitherto to have escaped recognition, and as the British Fauna is indebted to that acute observer for this addition, her name has been assigned to it. In some respects it bears a very close resemblance to the figures of *F. coronata*, Audouin, *Savign. Egypt.* pl. 9. f. 6, but I am inclined to think that it is distinct from that species, and in fact it seems to me that *F. coronata* and *F. umbracula* of the same work are identical; if so, the ovicells of *F. umbracula* are so peculiar as at once to remove any suspicion of the former species being one and the same with *L. Gattyæ*; but besides this, *F. coronata* appears to want the central umbo which exists in all specimens of *L. Gattyæ*; and the cells, if correctly drawn, are much wider below than those of the latter species, which terminate inferiorly in an acute point. The resemblance, however, between the two is very close, and should *F. coronata* and *F. umbracula* really not be identical, a very strong suspicion would arise of the identity of the former with *L. Gattyæ*.

20. Lepralia Hyndmanni. Pl. LXXXVII. figs. 5, 6, 7, 8.

Cells subglobose, raised in front; mouth orbicular, with a sinus in the middle of the lower lip; a long slender setose vibraculum on one side of the body. Ovicell small, arcuate.

Lepralia Hyndmanni, *Johnst. Hist. Brit. Zooph.* ed. 2. p. 306. t. 54. fig. 6.
Herentia Hyndmanni, *Gray, List Brit. Rad.* p. 122.
Hab. Sana Island, *Hyndman.* Belfast Bay, *W. Thompson.* Beaufort Dyke, off the west coast of Scotland, dredged by *Capt. Beechey* in 110–145 fathoms.

21. Lepralia personata, n. s. Pl. XC. figs. 2, 3, 4.

Cells oval, surface granular; mouth with a straight lower lip and five to seven spines above; a long vibracular process on one side of the body, and a central semilunar pore. Ovicell prominent, subglobose, with the lower lip very much produced and projecting.

Hab. East Falkland Islands, 4–10 fathoms, *Darwin.* On stones and fucus.

Except in the much larger size of the cells and the greater comparative length of the vibraculum, this form closely ap-

proaches *Lep. ciliata*; the difference in the form of the ovicell, however,—a striking and peculiar feature in the present species,—appears amply sufficient to justify their separation. The form of the ovicell in *F.* (*L.*) *umbracula* (*Aud. Expl.* i. p. 239; *Savign. Egypt.* pl. 9. fig. 3) is very similar apparently to that of *L. personata*, as is also in some degree that of the ovicells of *L. galeata* mihi, Pl. XCIV. figs. 1, 2) and of *L. reticulata* (Pl. XCIII. figs. 1, 2).

22. LEPRALIA DEPRESSA, n. s. Pl. XCI. figs. 3, 4.

Cells quite immersed, depressed, the upper margin only being slightly raised; outline suborbicular or suboval; mouth contracted in the middle, the lower half being filled in by a horny membrane, lip slightly thickened; a semicircular penthouse-like projection a short distance above the mouth; a vibraculum on the side of the cell nearly on a level with the mouth.

Hab. Egean Sea, on fucus, loosely attached, *E. Forbes.*

23. LEPRALIA LYALLII, n. s. Pl. CIII. fig. 6.

Cells oval, walls thin, verrucose or rugose; mouth raised, margin thickened, with a spout-like sinus in front, and five to six spines on the sides and above; a small vibraculum on many of the cells, on one side near the top.

Hab. New Zealand, on fucus, *Dr. Lyall, R.N.*

2. Inarmatæ.

Without either avicularia or vibracula.

a. With oral spines.

24. LEPRALIA VARIOLOSA. Pl. LXXIV. figs. 3, 4, 5. Pl. LXXV.

Cells oval, immersed or subimmersed, usually disposed in linear series; punctured or areolated round the margin, granular (sometimes punctured) in front; mouth rounded or subquadrangular, with two to four close-set spines quite at the summit; lower lip with a projecting mucro and an internal bifid denticle. Ovicells deeply immersed, also areolated round the margin.

Lepralia variolosa, *Johnst. Brit. Zooph.* 278. pl. 34. fig. 4; *Hassall, Ann. & Mag. Nat. Hist.* vii. 367; *Couch, Zooph. Cornw.* 50; *Corn. Faun.* iii. 116. pl. 22. fig. 6; *W. Thompson, Ann. Nat. Hist.* v. 253; *Johnst. Hist. Brit. Zooph.* ed. 2. p. 317. t. 55. figs. 8, 9.

Var. β. Lip with a denticle on the proximal margin, *Johnst. Brit. Zooph.* ed. 2. 317. t. 55. fig. 9.
Escharella variolosa, *Gray, List Brit. Rad.* p. 125.
Lepralia ovalis, *Hassall, Ann. Nat. Hist.* ix. 413; *Johnst. Brit. Zooph.* ed. 2. p. 307. pl. 56. fig. 1.

Mr. Peach appears to have noticed two marginal spines in this species, although the absence of spines enters into the characters given to it by the learned author of *British Zoophytes*; which is the more to be wondered at, since he quotes Mr. Couch's figure (pl. 22. fig. 6), in which three spines are represented. But as the next figure of what Mr. Couch terms *L. vinca* does not exhibit the smallest difference from that of his *L. variolosa*, I find it difficult to determine to what either of his forms really belongs. This synonym, therefore, must be admitted with great dubiety. This is one of the species which, when overgrown, is difficult of immediate recognition.

25. LEPRALIA NITIDA. Pl. LXXVI. fig. 1.

Cells ovate, raised in front; wall composed of four to nine ribs on each side, the spaces between which are filled up by a diaphanous membrane; mouth with four to six oral spines. Ovicell subglobose, surface granular. (Occasionally an avicularium on a small eminence at the lower point of the cell, or irregularly scattered in the interstices between the cells.)

Cellepora nitida, *Fabr. Faun. Grœnl.* 435. no. 443.
Cellepora (Escharoide) nitida, *M.-Edw. Lamk. Anim. s. Vert.* ed. 2. ii. 259.
Berenicea nitida, *Flem. Brit. Anim.* 533.
Lepralia nitida, *Johnst. Brit. Zooph.* 277. pl. 34. fig. 7; *Hassall, Ann. & Mag. Nat. Hist.* vii. 367; *W. Thompson, Ann. Nat. Hist.* v. 253; *Couch, Corn. Faun.* iii. 114. pl. 22. fig. 3; *Gray, List Brit. Rad.* p. 120.
Hab. Coast of Devon, *Miss Cutler.* Start Point, *J. S. Bowerbank.* Coast of Ayrshire, *Landsborough.* Isle of Man, *E. Forbes.* Scarborough, *Bean.* Berwick Bay, *Johnston.* Coast of Cornwall, *Peach.* Strangford Loch, *W. Thompson.* On shell and stone.

26. LEPRALIA ANNULATA. Pl. LXXVII. fig. 1.

Cells ovate, distinct; front slightly keeled, with five to seven shallow grooves on each side, each groove with a series of perforations; mouth suborbicular, margin thickened in the fertile cells, projecting into a mucro above and below; three distant

oral spines (wholly wanting in the fertile cell). Ovicell very small, inconspicuous, deeply immersed.

Cellepora annulata, *Fabr. Faun. Grœnl.* 436. no. 444; *Turt. Gmel.* iv. 641.
Lepralia annulata, *Johnst. Hist. Brit. Zooph.* ed. 2. p. 313. t. 55. figs. 2, 3; *Gray, List Brit. Rad.* p. 122.
Cellepora (Escharoide) bimucronata, *Lamx. Corall.* 41; *Lamk. Anim. s. Vert.* ed. 2. ii. 260.
Eschara bimucronata, *Moll, Eschara*, 65. t. 3. fig. 18.
Hab. Coast of Ayrshire, *Landsborough.* Shetland, *Barlee.*

The distinctness and usually larger size of the cells in this species, their having only three to four distant (the two lateral of which are much stronger than the others) oral spines, which are almost always, if not always, totally obsolete in the fertile cells, the peculiar arrangement of the pores, and, above all, the invariable absence of avicularia on each side of the mouth, will suffice to distinguish it from the deep-sea, thickened, or overgrown form of *L. punctata*, figured in Pl. XC. figs. 5, 6, to the mouth of which that of the fertile cells of *L. annulata* bears a very close resemblance.

27. LEPRALIA BISPINOSA. Pl. LXXX. figs. 1, 2, 3, 4.

Cells ovate, elongated, sometimes shorter and ventricose; mouth rotund or subquadrangular, with two long spines on the upper margin, and a strongly projecting mucro in front of the lower lip.

Lepralia bispinosa, *Johnst. Hist. Brit. Zooph.* ed. 2. p. 326. t. 57. fig. 10.
Discopora bispinosa, *Gray, List Brit. Rad.* p. 126.
Hab. Coast of Devon, *Miss Cutler.* Berwick Bay, *Johnston.* On shell.

28. LEPRALIA PEACHII. Pl. LXXXII. fig. 4. Pl. XCVII.

Cells globose, subimmersed, often punctured round the margin; surface granular or smooth; mouth suborbicular, with a thickened, slightly raised border, and six spines; a simple or bifid denticle on the lower lip, and usually a rostrum in front of the mouth. Ovicells immersed, with two spines in front of it on each side.

Lepralia Peachii, *Johnst. Hist. Brit. Zooph.* ed. 2. p. 315. t. 54. figs. 5, 6; *Gray, List Brit. Rad.* p. 118.
Lepralia immersa, *Johnst. Hist. Brit. Zooph.* ed. 2. p. 325. pl. 57. fig. 8.
Escharella immersa, *Gray, List Brit. Rad.* p. 125.

Berenicea immersa, *Flem. Brit. Anim.* 533.
? Berenicea flava, *Johnst. Trans. Newc. Soc.* ii. 268.
Hab. Start Point, *J. S. Bowerbank.* Orkney, *Lieut. Thomas.* Const of Devon, *Miss Cutler.* Belfast Bay, 20 to 35 fathoms, *W. Thompson.* Compton Bay, Isle of Wight, *id.* Dalkey, *id.* Beaufort Dyke, 110 to 147 fathoms, *Captain Beechey.*

Notwithstanding the apparently marked distinction between the typical forms of *L. variolosa*, *L. ventricosa*, and *L. Peachii*, some difficulty will be found in distinguishing them under certain conditions of age and overgrowth, or when much worn. In *L. variolosa* the ovicell is always deeply immersed, and has in front of it a single spine, or the stump of a single spine only, on each side; the normal number of oral spines in this species appearing to be two to three (in the former case it constitutes, as I imagine, *L. ovalis*, Hassall). In *L. Peachii* the ovicell is also immersed, but not so deeply, and always has two, or the remains of two, oral spines on each side in front of it, the normal number of these spines being, in this species, six; whilst in *L. ventricosa*, besides the more erect position, generally, of the upper part of the cell, the greater elevation of the mouth, &c., the ovicell is, comparatively speaking, free or much raised, shows, I believe, no spine in front of it, or one only, and the number of oral spines is invariably, or nearly so, four. With respect to the association of *L. Peachii* and *immersa*, Johnst., there can, I think, upon inspection of the figures in *Brit. Zooph.*, be no doubt of its propriety.

29. Lepralia ventricosa. Pl. LXXXII. figs. 5, 6. Pl. LXXXIII. fig. 5. Pl. XCI. figs. 5, 6.

Cells distinct above, or raised, immersed at the base, ventricose, ovate or subglobose; mouth orbicular, with a thickened raised margin; a bifid denticle on the lower lip, and four (rarely more) marginal spines; surface granular or irregularly striated; usually a pointed or broad mucro in front of the mouth. Ovicells globular, prominent.

Lepralia ventricosa, *Hassall, Ann. & Mag. Nat. Hist.* vii. 412; *Johnst. Hist. Brit. Zooph.* ed. 2. p. 305. t. 54. fig. 5; *Gray, List Brit. Rad.* p. 118.
Hab. Start Point, *J. S. Bowerbank.* Belfast Bay, *W. Thompson.* Strangford Loch, *id.* Beaufort Dyke, 110 to 147 fathoms, *Captain Beechey.*

30. Lepralia melolontha. Pl. LXXXV. fig. 3.

Cells distant, in linear series, obovate; a pointed conical

ascending process at the lower end; wall composed of six to eight contiguous ribs on each side; mouth suborbicular, with a projecting tubular process on each side, and two slender oral spines above. Ovicell ——?

Lepralia melolontha, *Landsborough's Pop. Brit. Zooph.* p. 18. pl. . fig. 70.

Hab. Estuary of the Thames, *Lieut. Thomas*, on shell. East Coast! *Mrs. Gatty*; *Busk.*

A very peculiar species, though in the costate structure of the cell approaching *L. nitida*, and to which it seems, perhaps, too closely allied. It grows in linear series, which branch out in an arborescent manner, closely adhering to the surface of dead shells. These branches, in process of growth, become more and more crowded, and finally coalesce into a continuous expansion. I first noticed this form in the year 1852, on some shells dredged at the mouth of the Thames by Lieut. Thomas, R.N., and afterwards found it on the coast of Suffolk, near the mouth of the Orwell; and about the same time it was found and its peculiarities observed by Mrs. Gatty.

31. LEPRALIA INNOMINATA. Pl. LXXXVI. figs. 2, 3.

Cells subglobose or ovate, rising in front into an umbo or short keel; furrowed, the grooves radiating from the central line; mouth suborbicular, with the lower lip straight; four to six marginal spines; a perforation a little below the mouth and above the umbo.

Lepralia innominata, *Couch, Corn. Faun.* iii. 114. pl. 22. fig. 4; *Johnst. Hist. Brit. Zooph.* ed. 2. p. 320. t. 55. fig. 12; *Gray, List Brit. Rad.* p. 121.

Lepralia pectinata, *Peach, MS.*

Hab. Start Point, *J. S. Bowerbank.* Coast of Cornwall, *Peach.* Off Sana Island, *G. C. Hyndman.* On shell.

32. LEPRALIA PUNCTATA. Pl. XC. figs. 5, 6. Pl. XCII. fig. 4. Pl. XCVI. fig. 3.

Cells subcylindrical, irregular, frequently wholly immersed, foraminiferous, the punctures obscurely rowed transversely; mouth oblong, transverse, occasionally very narrow, lower lip projecting, mucronate; four to six spines above, often wanting. Ovicell pyramidal, obscurely keeled in front, and sometimes crowned with a small avicularium at the apex; occasionally a small avicularium on one or both sides at the upper part of the body close to the mouth.

Lepralia arenacea, *Bean, MS.*

Lepralia punctata!, *Hassall, Ann. & Mag. Nat. Hist.* vii. 368. pl. 9. fig. 7; *Johnst. Hist. Brit. Zooph.* ed. 2. p. 312. t. 55. fig. 1. 478.
Cribrilina punctata, *Gray, List Brit. Rad.* p. 117.
Hab. Britain, not uncommon. Bangor, Co. Down, *W. Thompson.* Macgilligan, *id.* Ayrshire, *Dr. Landsborough.* Start Point, Devon, *J. S. Bowerbank.*

Notwithstanding the high authority of Mr. Bean and of Mr. Peach, there is no doubt that Dr. Hassall is quite right in assigning spines to the margin of the mouth. It is a very protean species, and in the old and deep-water condition requires some discrimination to distinguish it.

β. With an unarmed mouth.

33. LEPRALIA FIGULARIS. Pl. LXXIII. figs. 1, 2, 3.

Cells deeply immersed, confluent; central and upper portion of the front raised into an oval area, marked with five to six rows of punctures in shallow grooves radiating from the centre, and around the border of the raised area a series of eminences, either perforate at the apex or prolonged into short tubular processes; mouth orbicular, unarmed. Ovicell globose, lofty, with a central keel and a pyriform or lunate fossa on each side.

Lepralia figularis, *Johnst. Hist. Brit. Zooph.* ed. 2. p. 314. t. 56. fig. 2; *Gray, List. Brit. Rad.* p. 119.
Hab. Cornwall, *Peach.* Jersey, *J. Alder.*

34. LEPRALIA PERTUSA. Pl. LXXVIII. Pl. LXXIX. figs. 1, 2.

Cells ovate-ventricose, distinct or rhomboid, depressed, immersed, separated by a raised line, punctured; mouth orbicular, even, or slightly sinuated below; margin thickened, unarmed, usually an irregular tubercle below the mouth. Ovicells globose, punctured.

Cellepora pertusa, *Esper, Pflanz. Cellep.* p. 149. t. 10. fig. 2.
Lepralia pertusa, *Johnst. Hist. Brit. Zooph.* ed. 2. p. 311. t. 54. fig. 10; *Gray, List Brit. Rad.* p. 119.
Escharina pertusa, *M.-Edwards, Lamk. Anim. s. Vert.* ed. 2. ii. 232.
Cellepora perlacea, *W. Thompson, Ann & Mag. Nat. Hist.* x. 20.
Escharina perlacea, *M.-Edwards, Lamk. Anim. s. Vert.* ed. 2. ii. 234.
Hab. Orkney, *Lieut. Thomas, R.N.* Dartmouth, *E. Forbes.* Isle of Man, *id.* Cornwall, *Peach.* Off Sana Island, *G. C. Hyndman.* On shells and stone. ? Australia, *Macgillivray.*

The figures given in this Catàlogue will convey some idea of the multiplicity of forms assumed by this protean species.

35. LEPRALIA PALLASIANA. Pl. LXXXIII. figs. 1, 2.

Cells ovato-ventricose, surface verrucose, reticulate; mouth contracted below the middle, raised, with a plain thickened margin; lower lip straight.

Eschara pallasiana, *Moll, Seerinde*, p. 64. pl. 3. fig. 13.
Flustra hibernica, *Hassall, Ann. & Mag. Nat. Hist.* vi. 172. pl. 7. fig. 1, & vii. 370. (The figure quoted "represents a posterior view of the cells, the wall of each cell posteriorly being absent.")
Lepralia pedilostoma, *Hassall, Ann. & Mag. Nat. Hist.* vii. 368. pl. 9. fig. 4.
Lepralia pediostoma, *Johnst. Hist. Brit. Zooph.* ed. 2. p. 315. t. 54. fig. 7; *Couch, Corn. Faun.* p. 113. pl. 22. fig. 14.
Cellepora pallasiana, *Lamx. Polyp. Flex.* p. 95. no. 190; *Encyclop.* p. 184. no. 22.
Hab. Jersey, *Alder*. Off Copeland Islands, Bay of Belfast, deep water, *W. Thompson*. Dublin Bay; Plymouth Sound, *Hassall*. Cornish coast, very plentiful, *Peach*. Coast of Ayrshire, *Landsborough*. Berwick Bay (very rare); *G. Johnston*. Coast of Devon, *Miss Cutler*.

36. LEPRALIA CUCULLATA, n. s.? Pl. XCVI. figs. 4, 5.

Cells ovate, black, surface granular; mouth looking forwards, orbicular, upper margin usually arching over like a hood. Ovicell ——?

? Cellepora Mangnevillana, *Audouin, Expl.* i. 239; *Savigny. Egypt.* pl. 8. fig. 6 (non *Lamouroux*).
Hab. Egean Sea, *E. Forbes*.

In the absence of ovicells in the specimens in my possession, it is impossible to determine whether or no the present is identical with the species figured by Savigny, to which however, in other respects, it bears a very close resemblance. This form, although named by Audouin *Mangnevillana*, is clearly not the one intended by Lamouroux under that appellation (vid. *Polyp. Flex.* p. 890. pl. 1. fig. 3. *a*. B). A species of the same black colour, and in all respects resembling the present except in the less obliquity of the mouth and the absence of the raised upper border, occurs in Gibraltar Bay (*Dr. Landsborough*). The latter form is very like *L. reticulata*.

37. LEPRALIA LABIOSA, n. s. Pl. LXXXV. figs. 4, 5.

Cells pyriform or elongated and narrow at bottom, wide above, surface verrucose; mouth horizontal, rounded, with a deep sinus in front and an enormously thick, rounded projecting lip. Ovicell small, globose or subpyramidal; surface granular or verrucose.

Hab. Falkland Islands, *Darwin.* Completely incrusting a fucus, but readily detached.

Cells rounded and apparently unattached behind; they are of large size and very strongly constricted, of a deep brown colour.

38. LEPRALIA LABROSA, n. s. Pl. XCII. figs. 1, 2, 3.

Cells ovate, punctured, disposed in linear series, branching from a common centre; mouth orbicular, with a much-raised, thickened and expanded lip, which is usually deficient above. Ovicell globose, smooth, recumbent.

Hab. Off Copeland Islands, Belfast Bay, deep water, *W. Thompson.* On the inside of a dead shell.

Perhaps a variety of *L. ventricosa.*

39. LEPRALIA SIMPLEX. Pl. LXXXIV. figs. 1, 2.

Cells ovate, ventricose, erect superiorly and free; walls smooth, dense; mouth raised, suborbicular, or slightly sinuated below, with a thickened margin, usually an umbo on the front of the cell.

Lepralia simplex, *Johnst. Hist. Brit. Zooph.* ed. 2. p. 305. t. 54. fig. 4; *Gray, List Brit. Rad.* p. 118.

Hab. Belfast Bay, 20–35 fathoms, *W. Thompson.* Off Sana Island, *G. C. Hyndman.*

40. LEPRALIA AREOLATA, n. s. Pl. LXXXIII. figs. 3, 4.

Cells subovate or diamond-shaped, depressed, quite immersed, quincuncial, outlines marked by raised lines; surface granular; mouth suborbicular, with a sinus below and a raised and thickened margin.

Hab. Straits of Magellan, 10–20 fathoms, *Darwin.* On stone.

41. LEPRALIA ADPRESSA, n. s. Pl. CII. figs. 3, 4.

Cells quincuncial, oval, depressed, surface marked with grooves radiating from the lower border of the mouth; surface smooth; mouth rounded above, contracted below the middle, and with a straight lip below; margin slightly raised and thickened.

Hab. Chiloe, 96 fathoms, on shell, *Darwin.*

Forms a very closely adpressed crust on the outside of a small univalve shell.

42. LEPRALIA MALUSII. Pl. CIII. figs. 1, 2, 3, 4.

Cells ovate, frequently truncate at each end; front, especially round the margin, punctured with numerous stelliform pores; a central lunate pore; mouth rounded above, straight below, sometimes armed with three to four oral spines, sometimes forked. Ovicell smooth, sometimes porcellanous, grooved around the upper border, adnate to the front of the cell above.

Escharа Malusii, *Audouin, Expl.* i. 239; *Savigny, Egypt.* pl. 8. fig. 8.

Cellepora Macry, *W. Thompson, Ann. & Mag. Nat. Hist.* x. 20 (not *Chiaje?*, nor *M.-Edwards*).

Lepralia biforis, *Johnst. Hist. Brit. Zooph.* ed. 2. p. 314.

Herentia biforis, *Gray, List Brit. Rad.* p. 123.

Hab. Start Point, *J. S. Bowerbank.* Killinchy, Co. Down, *W. Thompson.* Roundstone, *id.* S. Patagonia, 48 fathoms; T. del Fuego; Falkland Islands, *Darwin.* New Zealand, *Dr. Lyall, R.N.* On shells, stones and fuci.

As there can be no doubt of the identity of this species with that figured by Savigny, I have thought it right to apply Audouin's name. The species is so peculiar as to require no additional observations, unless it were to draw attention to the uncertain occurrence and form of the oral spines in it. The ovicell in the South American forms is of a brownish hue; and in all the specimens from that region the cells appear to be much larger than in the more common European form. The cells adhere to the object upon which the Lepralia is placed by means of a central flattened disc, and not by the entire surface (Pl. CIII. fig. 3).

43. LEPRALIA GRANIFERA. Pl. LXXVII. fig. 2. Pl. XCV. figs. 6, 7.

Cells ovate or elongated, walls usually thin and vitreous, with rare punctures, particularly round the margin; an umbo a short distance below the mouth, sometimes wanting, and above that a minute round pore; mouth crescentic above, straight below, unarmed. Ovicell globose, raised, punctured.

Var. *a. cornuta.* A conical ascending process on each side of the mouth.

Lepralia granifera, *Johnst. Hist. Brit. Zooph.* ed. 2. p. 309. t. 54. fig. 7; *Gray, List Brit. Rad.* p. 118.

? Flustra impressa, *Audouin, Expl.* i. 240; *Savigny, Egypt.* pl. 10. fig. 7; (non *Lamarck*, ii. 222; nor *Moll, Esch.* p. 51. no. 7. pl. 2. fig. 9).

Hab. Coast of Ayrshire, *Landsborough.* Sidmouth, *Mrs. Gatty.* Holy Island and Berwick Bay, *G. Johnston.* Isle of Man, *E. Forbes.* Coast of Cornwall, *Peach.* Var. *a.* Lambay Island, *W. Thompson.* Portram, Ireland, *Mrs. Gatty.* On shells, stones and fuci.

44. LEPRALIA HYALINA. Pl. LXXXII. figs. 1, 2, 3. Pl. XCV. figs. 3, 4, 5. Pl. CI. figs. 1, 2.

Cells subcylindrical, elongated or compressed and raised in front, suberect, the wall thin, transparent and smooth; mouth circular, frequently with a contracted, often subtubular sinus below, the upper or posterior margin much raised, sharp. Ovicell globular, erect, free, punctured.

Var. β. *cornuta.* With a thick short tubular process on each side of the mouth.

Var. γ. *depressa.* Cells flattened, adpressed, contiguous.

Cellepora hyalina, *Linn. Syst.* 1286; *Fabric. Faun. Grœnl.* 435. no. 442; *Esper, Cellep.* t. 1. figs. 1, 2; *Lamx. Corall.* 38; *Bosc, Vers,* iii. 148; *Oken, Lehrb. Nat.* 86 (non *Cavolini* nec *Chiaje*).

Berenicea hyalina, *Hassall, Ann. & Mag. Nat. Hist.* vii. 367.

Cellepora personata, *Chiaje, Mem.* iii. 39. t. 34. figs. 17, 18, ovarian cell.

Escharina personata, *Lamk. An. s. V.* ii. 236. no. 24.

Lepralia hyalina, *W. Thompson, Ann. Nat. Hist.* v. 253; *Johnst. Hist. Brit. Zooph.* ed. 2. p. 301. t. 54. fig. 1.

Var. β. Wall of the cells thicker, calcareous and opake.

Lepralia cylindrica, *Hassall, Ann. & Mag. Nat. Hist.* vii. 368. pl. 9. fig. 6.

Var. γ. Cells heaped, usually opake and calcareous.

? Cellepora ovoidea, *Lamx. Corall.* 38. pl. 1. fig. 1; *Blainv. Act.* 444; *Lamk. Anim. s. Vert.* ed. 2. ii. 259; *Lamx. Exp. Méth.* 2. t. 64. figs. 4, 5; *D. Chiaje, Anim. s. Vert. Nap.* iii. 38. t. 34. fig. 33.

Celleporella hyalina, *Gray, List Brit. Rad.* p. 128.

Hab. Britain, common, on *Laminariæ* and other fuci. Ireland, common, *W. Thompson.* Cornwall, *Peach.* Orkney, *Lieut. Thomas, R.N.* California, *Dr. Sinclair.* Cape of Good Hope, *Harvey.* W. Greenland, 73° 20′ N., 57° 20′ W. Var. β. California, *Dr. Sinclair.* Var. γ. E. Falkland Island, 4–10 fathoms, *Darwin* (Pl. CI. figs. 1, 2).

45. LEPRALIA DISCRETA. Pl. CI. figs. 3, 4.

Cells decumbent, cylindrical, ringed, widely distant and connected to each other by tubular processes; mouth contracted, orbicular. Ovicell decumbent, slightly keeled in front, flattened, and wider above, not punctured.

Hab. E. Falkland Islands, 4–10 fathoms. T. del Fuego, *Darwin*. California, (from) *Dr. Greville*.

The three latter species, viz. *L. hyalina*, *annularis* and *discreta*, form a very natural group, with which *L. granifera* might not improperly be conjoined, and perhaps also *L. tenuis*.

46. LEPRALIA ANNULARIS. Pl. XCV. figs. 1, 2.

Cells decumbent, cylindrical, disposed side by side in concentric circular rows; mouth contracted, orbicular, with a strong tubular process on each side. Ovicell decumbent, acuminate, not punctured.

Eschara annularis, *Moll, Seerinde*, p. 39. pl. 1. fig. 4; *Pallas, Elench. Zooph.* p. 48. sp. 13 (sed sp. 9 huj. gen.); *Boddaert in Pall. Belg.* p. 59.

Escharina concentrica, *Lamarck*, ed. 2. ii. 237; *Lamouroux, Polyp. Flex.* p. 108.

Hab. Cape of Good Hope, *W. H. Harvey*. Algoa Bay. On fucus.

Fam. 11. CELLEPORIDÆ.

Polyzoarium composed of cells more or less vertical to its axis or plane, heaped together, or irregularly overlying each other.

1. CELLEPORA.

Polyzoarium calcareous, rigid, adnate or erect; composed of urceolate, suberect, contiguous cells, heaped together irregularly or arranged quincuncially. An ascending rostrum on one or both sides of the mouth, furnished with an avicularium.

Cellepora, sp., *O. Fabricius, Faun. Grœnl.*; *Johnst. Brit. Zooph.* ed. 2. p. 295; *Linn. System*; *Müller, Zool. Dan. Prod.*; *Berk. Syn.*; *Stewart, Elements*; *Lamarck, An. s. Vert.* (part.); *Lamouroux, Hist. Polyp. Flex.* p. 85 (part.); *Fleming, Brit. An.*; *Olivi, Zool. Adr.*

Spongites, *Oken, Lehrb. Nat.* 85, 1815.

Tubipora (part.), *Linn. Syst. Nat.*

Millepora, *Pall. Elenchus*; *Ellis & Solander* (part.).

Eschara (part.), *Pallas, Elench.*

** Adnate, globose, or spreading.*

1. CELLEPORA PUMICOSA. Pl. CX. fig.

Glomerous, cells heaped, ovate or pyriform; mouth orbicular; rostrum large, pointed; avicularium, on the internal aspect, oval. Ovicell small, recumbent.

Porous Eschara, *Ellis, Corall.* 75. no. 7. pl. 27. fig. *f*, F. & 72. pl. 30. fig. *d*, D.
Tubipora verrucosa, *Linn. Syst.* ed. 10. 789.
Cellepora pumicosa, *Linn. Syst.* 1286; *Müll. Zool. Dan. Prod.* 253; *Berk. Syn.* 1. 212; *Stew. Elem.* ii. 428. pl. 12. figs. 16, 17, copied from *Ellis*; *Lamk. Anim. s. Vert.* ii. 170, ed. 2. ii. 256; *Lamx. Corall.* 40; *Flem. Brit. Anim.* 532; *Johnst. Trans. Newc. Soc.* ii. 267; *Templeton, Mag. Nat. Hist.* ix. 469; *Couch, Zooph. Cornw.* 48; *Corn. Faun.* iii. 110. pl. 20. figs. 4, 5; *Johnst. Hist. Brit. Zooph.* ed. 2. p. 295. t. 52. figs. 1, 2, 3; *Gray, Hist. Brit. Rad.* p. 129.
Cellepora verrucosa, *Linn. Syst.* 1286; *Fabric. Faun. Grœnl.* 434; *Oliv. Zool. Adriat.* 229.
Cellepora spinosa, *Turt. Brit. Faun.* 205.
Millepora pumicosa, *Pall. Elench.* 254; *Ellis & Soland. Zooph.* 135; *Jameson, Wern. Mem.* i. 560; *Stew. Elem.* ii. 428.
Flustra bullata?, *Ellis & Soland. Zooph.* 16; *Stew. Elem.* ii. 436.
Madrepora verrucaria, *Esper, Madrep.* t. 17. figs. *c*, C & *b*, B.
Hab. Britain and Seas of Europe, common. California, *Dr. Sinclair.* ? Bass's Strait, *Macgillivray.* ? Tasmania, —— ?

2. CELLEPORA HASSALLII. Pl. CIX. figs. 4, 5, 6.

Cells cylindrical; mouth suborbicular or subquadrangular, lower lip mucronate, an ascending avicularium overlooking the mouth on each side. Ovicell punctured or striped, with a semilunar mark in front.

Cellepora bimucronata, *Hassall, Ann. & Mag. Nat. Hist.* vii. 367. pl. 9. fig. 1 (non *Lamouroux, Hist. Pol. Flex.* p. 93).
? Eschara bimucronata, *Moll, Eschar.* p. 65. no. 15. pl. 3. fig. 18.
Lepralia Hassallii, *Johnst. Brit. Zooph.* i. 304. pl. 54. fig. 3.
Celleporina Hassallii, *Gray, List Brit. Rad.* p. 128.
Hab. Coast of Ayrshire, *Landsborough.* Dublin Bay?, *Hassall.* On fucus and shells.

In a very beautiful and perfect specimen of this species, growing apparently on *Laminaria*, for which I am indebted to the kindness of Dr. Landsborough, the lower lip is produced into a very distinct and curiously formed mucro, and the structure of the lateral avicularia is remarkably well displayed. The cells are smooth and hyaline, and scarcely, if at all, ventricose, and I

am therefore very much in doubt, with Dr. Johnston, whether this form is to be referred to the *C. bimucronata* of Lamouroux.

3. CELLEPORA VITRINA.

Cells ovate, ventricose; mouth simple, orbicular; rostrum anterior, wanting in the marginal cells. Ovicell shallow, open in front, recumbent.

Cellepora vitrina, *Johnst. Brit. Zooph.* i. 300; *Couch, Corn. Faun.* pt. 3. p. 109. pl. 22. fig. 1.

Hab. Coast of Cornwall, not rare, *Couch.* Portaferry, Ireland, *W. Thompson.*

The figure of this species has been accidentally omitted, but will be given, with others, in a supplementary part of this Catalogue.

4. CELLEPORA BISPINATA, n. s. Pl. CXX. figs. 1, 2.

Cells ovate, elongated, surface granular; mouth orbicular or subquadrangular; rostrum anterior, with a very minute avicularium on one side; two long oral spines on the opposite margin.

Hab. Tasmania, *Mrs. Smith*; *J. D. Hooker.* On fucus.

5. CELLEPORA MAMILLATA, n. s. Pl. CXX. figs. 3, 4, 5.

Cells ovate, ventricose, immersed, forming an incrusting polyzoarium, the surface of which is studded with mamillary projections; mouth orbicular; rostrum large, conical, with a large avicularium on the internal face, sometimes a conical spine on the opposite side of the mouth.

Hab. Coast of Patagonia, *Darwin.*

** *Erect.*

6. CELLEPORA RAMULOSA. Pl. CIX. figs. 1, 2, 3.

Polyzoarium composed of dichotomous or irregularly dividing cylindrical branches. Cells ovate, slender; rostrum with a small avicularium on one side. Ovicell subglobose.

Cellepora ramulosa, *Linn. Syst.* 1285; *Müll. Zool. Dan. Prod.* 253; *Flem. Brit. Anim.* 532; *Johnst. Trans. Newc. Soc.* ii. 267. pl. 12. figs. 3, 4; *Lamk. Anim. s. Vert.* ed. 2. ii. 258; *Thompson, Ann. & Mag. Nat. Hist.* vii. 481; *Hassall, ibid.* vii. 367; *Couch, Zooph. Cornw.* 49; *Corn. Faun.* iii. 110. pl. 20. fig. 2; *Macgilliv. Ann. & Mag. Nat. Hist.* ix. 467; *Johnst. Hist. Brit. Zooph.* ed. 2. p. 296. t. 52. figs. 4, 5; *Gray, List Brit. Rad.* p. 129.

Cellepora pumicosa var., *Pallas, Elench.* 255; *Ellis & Soland. Zooph.* 136.

Cellepora lævis, *Macgilliv. Ann. & Mag. Nat. Hist.* ix. 467.

Hab. Britain, from Shetland to the South.

7. CELLEPORA SKENEI. Pl. CXXII.

Polyzoarium much compressed, lobes bifid or trifid; cells ovate, subventricose, punctated, slightly raised; mouth orbicular, with a strong mucro in front, having an avicularium on its inner aspect near the apex.

Millepora Skenei, *Ellis & Soland. Zooph.* 135; *Turt. Brit. Faun.* 204; *Stew. Elem.* ii. 427.
Cellepora palmata, *Flem. Brit. Anim.* 532.
Cellepora Skenei, *Johnst. Trans. Newc. Soc.* ii. 267; *Couch, Zooph. Cornw.* 49; *Corn. Faun.* iii. 111; *W. Thompson, Ann. & Mag. Nat. Hist.* xv. 322; *Johnst. Hist. Brit. Zooph.* ed. 2. p. 297. t. 52. figs. 6, 7, 8; *Gray, List Brit. Rad.* p. 130.
Hab. Aberdeen, *Skene.* Zetland, *Fleming.* Coasts of Northumberland and Berwickshire, not rare, *G. J.* Off the Deadman, "rare," *R. Q. Couch.* Eastern coast of Ireland, *Miss Ball.* On shell.

8. CELLEPORA FUSCA, n. s. Pl. CXIX. fig. 2. Pl. CXX. fig. 6.

Polyzoarium compressed, undulated. Cells ovate, ventricose, subimmersed, very irregular; mouth orbicular, with a raised, regular, or unevenly thickened margin; usually a strong rostrum on one side, with an avicularium on its inner aspect; numerous scattered avicularia, of various sizes and different forms, distributed over the polyzoarium. (Colour deep fuscous purple.)

Hab. Bass's Strait, *Macgillivray.*

Fam. 12. ESCHARIDÆ.

Polyzoarium erect, rigid, foliaceous and expanded, lobate or reticulated. Cells disposed quincuncially in the same plane, on one or both sides of the polyzoarium.

Escharidæ (part.), *Johnst. Brit. Zooph.* i. 329.
Lepraliana (part.), *Gray, List Brit. Rad.* p. 116, & Reteporana, *ib.* p. 130.

SYNOPSIS OF GENERA.

* *Cells on both sides.*

1. ESCHARA.

** *Cells on one side only.*

2. RETEPORA.

1. Escharа.

Polyzoarium foliaceous and expanded, or branched and sublinear. Cells disposed on both surfaces, back to back, immersed, coalescent, horizontal to the plane of the axis.

Eschara, *Ray*; *Fleming, Brit. Anim.* 531; *Johnst. Brit. Zooph.* ed. 1. 297, ed. 2. 350; *Lamk. Syst.* 375; *Hist.* ii. 173, ed. 2. 265; *Gray, List Brit. Rad.* p. 126.
Eschara, sp., *Pallas, Zooph.* 40; *Moll.*
Nullipora, sp., *Solander.*
Cellepora, sp., *Esper.*

* *Polyzoary more or less expanded, foliaceous.*

1. Eschara foliacea. Pl. CVI. figs. 4, 5, 6, 7.

Cells ovate or rhomboidal, obscurely punctured or granular; mouth contracted about the middle, with a small avicularium on the middle of the lower lip.

Eschara retiformis, *Raii Syn.* 1. 31; *Flem. Brit. Anim.* 531.
Stony foliaceous Coralline, *Ellis, Corall.* 71. no. 3. pl. 30. fig. *a*, A, B, *c*; *Borl. Cornw.* 239. pl. 24. fig. 6.
Eschara fascialis, *Pall. Elench.* 42; *Moll, Seerinde*, p. 36. pl. 1. fig. 2.
Millepora foliacea, *Ellis & Solander, Zooph.* 133.
Millepora fascialis, *Linn. Gm.* p. 3785. sp. 14; *Marsigli, Hist. phys. de la Mer*, p. 148. t. 33. fig. 160.
Cellepora lamellosa, *Esper, Cellep.* p. 146. t. 6. figs. 1–5.
Eschara foliacea, *Lamk. Anim. s. Vert.* ii. 174, ed. 2. ii. 266; *Blainv. Actinol.* 428. pl. 75. fig. 3; *Milne-Edwards, Ann. des Sc. Nat.* vi. 36. pl. 3. fig. 1; *Couch, Zooph. Cornw.* 60; *Corn. Faun.* iii. 131; *Johnst. Hist. Brit. Zooph.* ed. 2. p. 351. t. 67; *Gray, List Brit. Rad.* p. 126.
Hab. Britain, common, especially on the south coast; Mediterranean, *M'Andrew.*

2. Eschara contorta, n. s. Pl. CVIII. figs. 1, 2, 3.

Cells ovato-ventricose, punctured; mouth orbicular, with a small mucro in front, and an ascending, spathulate avicularium on each side; usually one or two smaller avicularia on the front and sides of the body.

Hab. Algoa Bay.

*** Polyzoary divided into branching lobes.*

3. ESCHARA URCEOLATA, n. s. Pl. CV. figs. 4, 5, 6.

Cells elongated, pitcher-shaped; surface granular; mouth subquadrangular; lower margin produced into a long conical rostrum, at the base of which, on the upper side, is a semicircular avicularium.

Hab. Algoa Bay.

4. ESCHARA PLATALEA, n. s. Pl. CV. figs. 1, 2, 3. Pl. CVIII. fig. 4.

Cells ovate, acute inferiorly, with a depressed area below the mouth in front, at the bottom of which is a simple pore. Avicularia irregularly scattered over the polyzoary, rare, with a spoon-shaped mandible.

Hab. Bass's Strait; off Cape Capricorn, Australia, *Macgillivray.*

5. ESCHARA LICHENOIDES. Pl. CVI. figs. 1, 2, 3.

Cells ovate, punctured in the centre by three to four stellate pores, which soon coalesce into a single apparent opening; mouth suborbicular; a small prominent avicularium on each side immediately below the mouth, looking outwards.

Eschara lichenoides, *Milne-Edwards, sur les Eschares*, p. 31. pl. 2. fig. 3; *Lamarck*, ed. 2. ii. 268; *Seba, Mus.* 3. t. 100. fig. 10; *Lamouroux, Encyc.* p. 375; *Cuvier, Règ. Anim.* ed. 2. t. 3. p. 316; *Blainville, Man. d'Actinol.* p. 428.

Hab. Bass's Strait; off Cape Capricorn; between Cumberland Island and Point Slade (Australia), *Macgillivray.* Algoa Bay.

This appears so closely to accord with the description of *E. lichenoides*, M.-Edw., that I have little doubt it is that species; either this or the preceding certainly is, perhaps both.

6. ESCHARA FUEGENSIS, n. s. Pl. CVII. figs. 1, 2, 3.

Cells pyriform, arched above the mouth; a central pore in front, and an avicularium pointing obliquely inwards and upwards on each side; mouth crescentic (in age the mouth becomes perfectly circular and very small, the cells and the interstices being covered and filled up with a perforated overgrowth).

Hab. Coast of S. Tierra del Fuego, 30 fathoms, *Darwin.*

7. ESCHARA DECUSSATA. Pl. CVII. figs. 4, 5, 6.

Cells ovate, mostly separated by raised lines, between which and the central ovate portion of the front is a shallow sulcus; an avicularium with an acute mandible pointing upwards on the middle immediately below the subcrescentic mouth.

Eschara decussata, *M.-Edw., Lamk.* ed. 2. ii. p. 267; *M.-Edw., sur les Eschares*, p. 40. pl. 4. fig. 2.
Hab. Seas of Australia, *Macgillivray.*

Whatever obscurity may attach to *E. lichenoides*, M.-Edw., there can be no doubt about the present species being the one intended by that author.

8. ESCHARA FLABELLARIS. Pl. CVII. figs. 7, 8, 9, 10.

Polyzoary flabellate, attached by a flexible stem composed of horny tubes. Cells ovato-ventricose, punctured; a crescentic pore a little below the mouth, and an avicularium on the side and upper part of the cell; mandible acute, pointing directly outwards. Ovicells globose, prominent, subgranular or smooth.
Hab. Algoa Bay.

9. ESCHARA GRACILIS. Pl. CVIII. figs. 5, 6, 7.

Polyzoary composed of slender, slightly compressed, subcylindrical branches. Cells deeply immersed, pyriform, bulging above; an elongated central pore (? avicularium); in the quite young cells a mamillary projection on each side a little below the mouth; mouth orbicular, with a minute denticle below.

Millepora tenella, *Esp. Suppl.* i. t. 20.
Eschara gracilis, *Lamouroux, Encyc.* p. 375; *Blainville, Man. d'Actinol.* p. 428; *Lamarck, An. s. Vert.* ii. 268. ed. 2; *M.-Edwards, sur les Eschares*, p. 28. pl. 2. fig. 2.
Hab. Bass's Strait, parasitic on *Catenicella elegans*; *Macgillivray.*

The closed cells noticed by M.-Edwards are not improbably ovicells.

10. ESCHARA GIGANTEA, n. s. Pl. CXIX. fig. 3.

Polyzoary very thick and solid, lobes wide, undulated. Cells smooth, solid, ventricose, ovate or subhexagonal, immersed and coalescent; a deep penthouse-like projection above the mouth, the lower lip of which projects.

Hab. South Patagonia, *Darwin.*

11. ESCHARA CERVICORNIS. Pl. CIX. fig. 7. Pl. CXIX. fig. 1.

Polyzoary much branched, compressed. Cells at the growing extremities ovate, elongated; mouth orbicular, lower margin sinuated and projecting, with a semicircular avicularium within the sinus. In the older parts of the polyzoary the cells are deeply immersed, the mouth often subtubular and projecting, or immersed and sinuated below with the avicularium as above.

? Poro cervino, *Imperato, Hist. Nat.* p. 630 (1572); ? *Bonanni, Museum Kirch.* p. 286. fig. 13 (1709).

? Porus cervinus minor, *Marsigli, Hist. physique de la Mer*, (1525) p. 63. pl. 32. fig. 152.

Millepora cervicornis, *Ellis & Solander*, (1786) p. 134; *Pallas, Elenchus Zoophyt.*; *Stewart's El.* ii. p. 427; *Turton, Brit. Fauna*, 204.

Millepora compressa, *Sow. Brit. Miscell.* 83. pl. 41; *Jameson, in Wern. Mem.* i. 560; *Oken, Lehrb.* 86?

Eschara cervicornis, *Lam. Hist. Nat. des An. s. V.* ed. 2. ii. 267; *Lamouroux, Encycl.* p. 374; *Blainville, Dict. d. Sc. Nat.* xv. 297, & *Man. d'Actinologie*, p. 428; *M.-Edwards, Sur les Eschares*, p. 15. pl. 1, & pl. 2. fig. 1.

Cellepora cervicornis, *Couch, Zooph. Cornw.* 49; *Cornish Fauna*, pt. 3. p. 111. pl. 20. fig. 1.

Porus cervinus, *Borlase, Cornw.* 240. t. 24. fig. 7 (not *Marsigli*).

Millepora alcicornis, *Esp. Millep.* t. 5, 6, 7.

Hab. Start Point? from *J. S. Bowerbank.*

From the figures of *Cellepora cervicornis* given (*Brit. Zooph.* pl. 53), that species would appear to differ from the present, not only in habit, but more particularly and importantly in the shape of the oral apertures in the older or immersed portions of the polyzoary. In the specimen from which the figures in this Catalogue were taken, and the present description drawn up, the characters so exactly accord with those assigned to it and figured by M. Milne-Edwards, that I cannot entertain a doubt upon the identity of the form I have had before me and the one he has in view. The exact habitat of my specimen is unfortunately not quite certain: I have it marked Britain, but am not sure whether Mr. Bowerbank procured it, or had it from the coast of Devon, or from the Orkneys or Shetland; in any case, however, it is a British species, and until further evidence is offered of another much-resembling form, I must entertain grave doubts as to the existence of a distinct one so nearly allied as that figured in *Hist. of Brit. Zoophytes*; and this notwithstanding the opinion of M. Milne-Edwards to the contrary (*l. c.* p. 16).

It is to be remarked, that in the older parts of the polyzoary of my specimen, the surface presents numerous protuberant

cells, scattered irregularly over it, and which if multiplied, as under circumstances it is quite conceivable they might be, would afford the heaped or confused aspect and structure of the genus *Cellepora*, and make it accord with figs. 4 & 5 of Dr. Johnston's plate. The genus requires further research.

2. Retepora.

Polyzoarium foliaceous, calcareous, reticulated. Cells immersed, opening on one surface only.

Millepora, *Linn.* (part.); *Ellis & Solander*; *Esper*; *Marsigli, Hist.*; *Cuvier, Règn. Animal* (spec.).
Retepora, *Imperato, Hist. Nat.*; *Lamarck*, ii. 274; *Risso, L'Europe Mérid.*; *Flem. Brit. An.*; *Stark, Elem.* ii.; *Blainv. Actin.*; *Couch, Corn. Faun.*; *Johnst. Brit. Zooph.* i. 353; *Goldfuss* (part.); *Hagenow* (part.).
? Frondipora, *Oken, Lehrb.* 63, 1815; *Blainville, M. d'Actinologie.*

1. Retepora cellulosa. Pl. CXXI. figs. 3–8. Pl. CXXIII. figs. 5, 6.

Polyzoarium turbinate or crateriform, undulated, curled, rising, with a sort of peduncle. Cells subcylindrical; a prominent rostrum in front of the mouth, having a minute avicularium on one side at the base; a marginal spine on each side of the mouth; scattered avicularia of various sizes and forms dispersed over the polyzoarium.

'Stony Eschara' of Imperatus 'full of holes like a net,' *Ellis, Corall.* p. 72. pl. 25 *d*, D, F.
Retepora eschara marina, *Imperato, Hist. Nat.* p. 630 (cited by *Ellis*).
? Millepora cellulosa, *Jameson, Wern. Mem.* i. 560; *Turt. Brit. Faun.* 205; *Stew. Elem.* ii. 427; *Cavolini, Pol. Mar.* p. 64. pl. 3. figs. 12 & 13.
Millepora foraminosa, *Ellis & Soland. Zooph.* 138. pl. 26. fig. 2.
Frondipora cellulosa, *Oken, Lehrb. Nat.* 63.
Millepora Retepora, *Borl. Cornw.* 240. pl. 24. fig. 8; *Pallas, Elench.* p. 243.
Retepora reticulata, *Johnst. Hist. Brit. Zooph.* ed. 2. p. 353; *Couch, Corn. Faun.* iii. 130.
? Frondipora reticulata, *Blainv. ibid.* 406. pl. 69. fig. 1.
? Frondipora clathrata, *Oken, Lehrb. Nat.* 64.
Manchette de Neptune, *Daubenton, Ic.* t. 23.

Retepora cellulosa, *Lamouroux, Exp. Méth. des Polyp.* p. 41. pl. 26. fig. 2; *Deslongchamps, Encyclop. Zooph.* p. 669; *Cuvier, Règne Anim.* ed. 2. iii. 316; *Schweigger, Handb.* p. 431; *Blainv. Man. d'Actin.* p. 433. pl. 76. fig. 1; ? *Reuss, Fossil Polyp. d. Wien. Tertiar-Beckens*, p. 47. pl. 6. fig. 34.
? Retepora frustulata, *Lamarck, l. c.* p. 279.
? Retepora vibicata, *Goldfuss, Pet. Germ.* i. 103. t. 36. fig. 16.
Hab. Mediterranean. Britain? Cape Horn, 40 fathoms, *Darwin.* Australian Seas (a more slender variety?), *Macgillivray.*

2. RETEPORA BEANIANA. Pl. CXXIII. figs. 1–5.

Polyzoarium infundibuliform, wavy, on a short peduncle. Cells subcylindrical; a prominent rostrum in front of the mouth, on the point of which is a semicircular avicularium, and from which a slightly raised keel descends upon the front of the cell, which therefore appears to be hollowed on the sides; a spine on each side of the mouth.

Millepora cellulosa, *Jameson in Wern. Mem.* i. 560; *Turton, Brit. Fauna*, 205; *Stew. Elem.* ii. 427.
Retepora cellulosa, *Johnst. in Loud. Mag. Nat. Hist.* vii. 638. fig. 69; *S. V. Wood, Ann. & Mag. Nat. Hist.* xiii. 16; *W. Thompson, ibid.* xv. 322.
? Retepora beaniana, *King in Ann. & Mag. Nat. Hist.* xviii. 237; *Landsborough, Pop. Hist. Brit. Zooph.* p. . pl. . fig. .
Hab. Shetland Islands and in the Island of Fulah, *Jameson.* Scarborough, *W. Bean.* ? Cape Clear, Ireland, *Prof. Allman.* Orkneys, *E. Forbes, Barlee.* Deep water off the coast of Northumberland, *W. King.*

The very minute difference between the two foregoing species, unless proved to be constant, is hardly sufficient to render them distinct; and although I have here so arranged them, I am by no means satisfied that it is correct. There is a considerable difference in the habit of the Australian form, but very close investigation has failed in my hands to establish any other definable distinction. The figure, of the natural size, here given, is taken from a magnificent specimen taken in Embleton Bay, Northumberland, and in the possession of Mr. Alder.

3. RETEPORA PHŒNICEA, n. s.? Pl. CXXI. figs. 1, 2.

Polyzoary foliaceous, expanded, much convoluted. Cells ovate, ventricose; mouth raised, circular, sometimes subtubular, entire or irregularly serrated; cells where immersed bordered by a raised line; many cells with an avicularium placed obliquely on the front, just below the mouth; mandible very wide at the

base and acuminate. Ovicells immersed (in the young state covered in front by a concentrically marked operculum). (Colour purple.)

Hab. Bass's Strait, *Macgillivray*.

This is doubtless one of the forms alluded to by Lamarck (*l. c.* p. 277) as brought by Péron and Lesueur from the Indian Seas, and as of a purple colour; and may probably be the species figured in *Rumph. Amboin.* 6. t. 87. fig. 5.

Fam. 13. VINCULARIADÆ.

Polyzoarium rigid, calcareous, unarticulated; cells disposed alternately around an imaginary axis, forming dichotomously dividing branches. Surface of polyzoary not areolated. The family includes (among many other fossil forms)—

Vincularia, *Defrance, Dict. d. Sc. Nat.*; *Blainville*; *Hagenow, Bryoz. d. Maest. Kreideb.* p. 59.
Glauconoma, *Goldfuss, Petrefact. Germ.*
Siphonella, *Hagenow* (*l. c.*) p. 83.
Cellaria (part.), *Reuss, Fossil Polyp. d. Wien. Tertiar-Beckens*, p. 58.

Three families of cheilostomatous Polyzoa, characterized by a polyzoarium formed of cylindrical branches in which the cells are disposed around an imaginary axis, are given in this Catalogue. In the first of these (Part I. p. 15), the SALICORNARIADÆ, the branches are articulated by flexible joints, and the ovicells are deeply immersed. In the second, the FARCIMINARIADÆ (p. 32), the polyzoarium is continuous throughout, and the ovicells are prominent and globose; the structure moreover of the only species referred to it is corneous and flexible. In the third, termed the VINCULARIADÆ, and as here constituted, the polyzoarium is also continuous throughout, but the structure is calcareous and rigid, and the ovicells are inconspicuous or deeply immersed.

Whether these distinctions are sufficient to constitute family groups may be a matter of dispute, but, from analogy with other groups of Polyzoa, I think that the articulation or non-articulation of the polyzoary is an important (artificial) character; and with respect to the *Farciminariadæ*, the distinction between the soft and flexible *F. aculeata* and the forms (fossil) included under *Vincularia* and its allies, appears to be too marked to allow of their association, independently of the different position of the ovicells.

The genus *Vincularia*, to which I have referred the species

represented in Pl. LXV. fig. 2, has hitherto been known only in certain fossil forms, the composition of which, as is observed by M.-Edwards (*Lamarck, Hist. d. An. s. Vert.* ed. 2. ii. 193), is "essentially the same as that of the *Salicornariæ* of Cuvier:" but he goes on to say, "as only very minute fragments of them have been found, it is unknown whether the cylinders resulting from the coalescence of a certain number of longitudinal rows of cells are articulated or not; in the latter case the proposed generic division should be retained, whilst in the opposite there would be no sufficient reason to separate them from *Cellaria* (*Salicornaria*) properly so called.

The occurrence of a recent species clears up this point, if it were not sufficiently evident before, and I am therefore so far supported, in the distinction of the group from the *Salicornariadæ*. The same value appears to be attached to this character also by Hagenow (*l. c.* p. 59); and from a note in page 60 it would appear that Prof. Philippi is now of the same opinion.

1. Vincularia.

Branches of polyzoarium not tubular; front of cells surrounded by a raised border, arcuate above, nearly straight below. Ovicells immersed, opening above the mouth of the cell upon which they are placed.

1. Vincularia ornata. Pl. LXV. fig. 2.

Margin of cell much raised, granular; lamina granular, irregularly denticulate on its internal edge.

Hab. Patagonia, *Darwin*.

It would appear that the present species belongs more to the type common in the cretaceous formation than to that met with in the tertiary; that is, to those *Vincularie* in which the cells are surrounded with a border; whilst, according to Hagenow (*l. c.* p. 60) and Reuss, the forms probably referable to the same family group, though perhaps not to the same genus, the species with ventricose, oval cells, *e. g.* (*Cell. duplicata, labrosa, Michelini, coronata, Schreibersi, &c.*, Reuss, *l. c.*), are peculiar to the tertiary rocks. This observation, however, will hardly hold good with respect to such forms as *Cell. macrostoma*, Reuss, *l. c.* pl. 8. figs. 5, 6; *Cell. Haidingeri*, pl. 7. fig. 30; *Cell. cucullata*, pl. 7. fig. 31; *Cell. exarata*, pl. 7. fig. 32; all of which appear to me to belong to the true *Vincularie*.

The proper comparison, however, not only of these, but of all fossil forms of Polyzoa, with recent ones, yet remains to be made.

Fam. 14. Selenariadæ.

Polyzoary more or less regularly orbicular, convex on one side, plane or concave on the other, probably free. Furnished with large and powerful vibracula (probably locomotive) (often having arenaceous particles affixed in the centre of the under surface).

Synopsis of Genera.

1. *Each cell with a vibraculum at its apex.*

1. Cupularia.

2. *The cells and vibracula in alternate rows radiating from the centre.*

2. Lunulites.

3. *Certain of the cells only, furnished with vibracula.*

3. Selenaria.

1. Cupularia.

Each cell throughout the polyzoarium with a vibracular cell at its apex.

Cupularia, *Lamouroux, Exposit.* p. 44 (proposed).
Lunulites, *id. ib.* (part.); *Defrance, Dict. des Sc. Nat.* (part.); *Deslongch. Encyclop. Zooph. B.* (part.); *Goldfuss, Petrefact. Germ.* (part.); *Blainville, Man. d'Actin.* (part.); *Gray, Spicilegia Zoologica,* pt. 1. p. 8; *Cuvier et Brongniart, Descript. géolog. des Environs de Paris* (part.); *Lonsdale, Miocene Fossils from N. America, Journal of Geol. Society.* i. 503 (not *Eocene Fossils, ib.* p. 531); *Michelin, Icon. Zoophyt.* (part.).
Fenestella, *Lonsdale* (*Append. Geol. of Russia*) (part.).

Besides the peculiar formation of the polyzoary, all the *Selenariadæ* are distinguished by the circumstance that the cells of which it is constituted are of two kinds, usually differing in size, the one being smaller than the other. The distinction between the different genera into which I have thought it convenient to divide the family is derived solely from the different relative position of these two kinds of cells to each other, or to the entire polyzoarium. The propriety of the division of the Lunulite group into two genera appears to have occurred to Lamouroux,

and as one of the subdivisions for which he proposed the name *Cupularia* coincides with the one of those into which I believe it naturally falls, that name has been retained. The same division of the genus *Lunulites*, as originally constituted, is suggested by Mr. Lonsdale's observations with respect to *Lunulites denticulata* (*l. c.* p. 503), and it is consequently sufficiently apparent that the generic divisions here adopted will apply equally to fossil and to recent forms. The examination of the former alone, however, would never have led to the proper appreciation of the characters here employed, because, from fossil specimens, it was impossible to arrive at any satisfactory elucidation of the respective nature of the two kinds of cells. Mr. Lonsdale hints (*l. c.* p. 504) that the secondary pores or small chambers in the quincuncial species offer a perfect analogy with the chambers in *Eschara* and *Escharina*, "supposed to be receptacles for maturing gemmules;" but in this, as I have fully ascertained from the examination of numerous recent species, he is mistaken. The secondary chambers are the cells of vibracula, and in the living state contain probably nothing but the muscular apparatus for the movement of a very long and strong vibracular organ. Where the true ovicells are, if such organs exist in this family, I have been unable to perceive; but that the smaller cells in question are of the nature I have mentioned will be sufficiently obvious on inspection of almost any of the figures here given. As the present part of this Catalogue is limited to recent species, no mention is here made of fossil ones, of which a future opportunity will be taken to speak.

To facilitate the description of the species, it will be as well to define certain terms, which it is convenient to employ.

1. *Area of cell* means the space occupied by the front of each cell, which is bounded by a raised line.

2. *Lamina* is the calcareous expansion which partially forms the anterior wall of the cell, the rest being occupied by a membranaceous or horny layer, as in *Membranipora*.

3. *Aperture* is the opening or space thus left unfilled by the calcareous lamina, in the upper end of which, or that furthest from the centre of the polyzoary, is the true mouth, with the moveable lip, which is for the most part removed with the horny layer.

4. *Vibracular opening* is the opening of the cell containing the muscles for the movement of the *vibraculum*.

1. CUPULARIA GUINEENSIS, n. s. Pl. CXIV.

Polyzoary orbicular, in section crescentic; area of cell rhomboidal, aperture ovoid, lamina granular; vibracular opening au-

riform, entire, with a slight elevation on one side. Under surface of polyzoary divided into hexagonal areas, each corresponding to a cell.

Hab. New Guinea. B.M. Collection.

2. CUPULARIA OWENII. Pl. CXV.

Polyzoary orbicular, depressed; area of cell rhomboidal, subelongated; lamina finely granular; aperture irregular, margin jagged; vibracular opening suboval, entire; under surface of polyzoarium marked with bifurcating sulci, and each ridge with a median line.

Lunulites Owenii, *Gray, Spicilegia Zoologica,* pt. 1. p. 8. t. 3. fig. 15 (1828).
Hab. Coast of Africa.

This species appears to differ from *Lunulites denticulata* (*Conrad, Silliman's Journal,* Oct. 1841, xli.) mainly in the more depressed form of the polyzoary. But I think this difference is quite sufficient to render the identity of the two forms more than problematical. The American species appears, in respect of its conical form and other characters, entirely to correspond with what has been termed *L. Owenii* of the Coralline Crag; and notwithstanding a former opinion to the contrary, I am now inclined, for several reasons, to believe that the fossil must be regarded as distinct from the recent form.

3. CUPULARIA LOWEI. Pl. CXVI.

Polyzoarium irregular in outline; area of cell rhomboidal, wide; no aperture; lamina cribriform or granular, or nearly smooth, according to age; vibracular opening auriform, entire, with an elevation on one side; mouth crescentic, with a straight lip below, margin raised.

Lunulites Lowei, *Gray, MSS.*
Hab. Madeira, *Lowe.*

4. CUPULARIA STELLATA, n. s. Pl. CXVIII.

Polyzoarium orbicular, depressed, deeply serrated at the margin; area of cell suboval or subrhomboidal; lamina narrow and smooth or wanting; aperture oval or elliptical; vibracular opening small, with a prominent tooth on one side, below which is a sinus.

Hab. Philippine Islands.

The cells are deeper than they appear in the drawing, and the inner lamina should be less decidedly expressed.

5. CUPULARIA PYRIFORMIS, n. s. Pl. CXXIV.

Polyzoary subconical or depressed, stellate; cells pyriform; upper part raised, contracted; margin of aperture thin, smooth; an internal lamina, the lower border of the opening in which is straight; under surface deeply grooved, ridges carinate, obscurely punctate, with a single row of dots on either side.

Hab. St. Vincent. Collection B.M.

At first sight this species offers a close resemblance to the preceding, from which, however, it differs in several respects. Among which are—1. the raised and free superior extremity of the cell, the contracted neck between the vibracular opening and the aperture of the cell; 2. the thin overlapping margin of the aperture; and 3. the punctation, though obscure, on the posterior surface. Both species appear to grow upon arenaceous particles.

2. LUNULITES.

Cells arranged in series radiating from the centre and bifurcating as they advance; vibracula in linear series alternating with those of the cells.

Syn. as for *Cupularia* (part.).

The observations given under the preceding genus are equally applicable here; it is necessary in addition merely to remark, that it is probable the vibraculum itself in this genus is distinguished by having a bifid or trifid extremity; and that it is not unlikely, from the length, strength and disposition of these organs, that they may be employed for the purpose of locomotion as well as of defence.

1. LUNULITES GIBBOSA, n. s. Pl. CXI.

Polyzoary very irregular in its form; area of cell arched above, straight below; margin granular; no lamina; vibraculum bifid or trifid at the extremity; under side of polyzoary nearly even, marked with faint lines, punctured, punctures in single or double series on each ridge.

Hab. Off Cape Capricorn, *Macgillivray*.

2. LUNULITES CAPULUS, n. s. Pl. CXII.

Polyzoary conical, much raised; area of cell semilunar or arched above, straight below, with a small bifid denticle within

the lower margin; margin granular; vibracula trifid at the extremity; under surface of polyzoary grooved, ridges punctured with a single row of openings.

Lunulites capulus, *Busk, Voy. of Rattlesnake*, i. pl. 1. figs. 13, 14.
Hab. Off Cape Capricorn, *Macgillivray*.

3. LUNULITES PHILIPPINENSIS, n. s. Pl. CXIII. figs. 1, 2, 3.

Polyzoarium subconical, serrate at the edge, flat beneath and porous, pores umbilicate; opening of cell pyriform, margin not raised; vibracular opening minute, circular.

Hab. Philippine Islands.

4. LUNULITES CANCELLATA, n. s. Pl. CXIII. figs. 4, 5, 6, 7.

Polyzoarium conical, raised, flat beneath and the centre perforated by numerous umbilicate openings; internally cancellated; opening of cell circular, with a simple raised margin; vibracular openings minute, oval, oblique.

Hab. Philippine Islands.

This species and the one immediately preceding are very curious forms and would appear to constitute a peculiar group, characterized by the circumstance that the concave side of the polyzoary is more or less filled up by a cancellated structure.

3. SELENARIA, n. g.

Only a certain number of cells dispersed throughout the polyzoary furnished with vibracula. The front of each cell, so furnished, covered by a cribriform calcareous expansion; others arched above, contracted below; under surface of polyzoary marked with grooves.

1. SELENARIA MACULATA, n. s. Pl. CXVII.

Polyzoary orbicular, on section crescentic; vibracula contorted, finely ringed.

Lunulites maculata, *Busk, Voy. of Rattlesnake*, i. pl. 1. figs. 15, 16.
Hab. Bass's Strait.

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OBSERVATIONS

ON THE

AVICULARIAN AND VIBRACULAR ORGANS

OF THE

POLYZOA.

In the characters of the species of cheilostomatous Polyzoa contained in the foregoing two Parts of this Catalogue, considerable use has been made of the *avicularian* and *vibracular organs*, the possession of which appears, so far as I know, to be peculiar to that Suborder. I have therefore thought that it might be useful to subjoin a few observations on the subject of these organs, for the purpose of indicating how far our knowledge of them at present extends, and of directing attention more particularly to their value as affording diagnostic or systematic characters. Much of the following observations is taken from a paper recently published in the Transactions of the Microscopical Society, with which figures are given illustrative of the subject.

The organs in question are of two kinds, the one forming a sort of pincers, and the other consisting of a long, slender, moveable seta, and the muscles by which it is moved contained in a special receptacle or cell.

To the former set of organs, of whatever form, the term *avicularium* is here understood to be applicable, and the latter are designated as *vibracula*. With respect to the structure of these organs of either class it is sufficient to remark, that, however diverse their appearance may be, they are all constructed upon the same general type, that is to say, the organ consists of a hollow cup, containing two sets of muscles for the movements of its

motile portion, the *mandible*, as I have termed it in the one case, and the *seta* in the other.

The *avicularium*, besides the moveable *mandible*, which varies extremely in form and length, always has a more or less well-marked, corresponding fixed *beak*, the opponent as it were of the mandible and serving to constitute the organ an instrument of prehension.

This beak is necessarily absent in the *vibraculum*, which appears to be merely a defensive organ, or perhaps in some cases (as in the *Selenariadæ*) having a locomotive function, and its absence in cases where the moveable part of the organ is detached would serve to distinguish the one kind of organ from the other. It is to be regretted, however, that in the instance of fossil species, where such a character would often be of extreme value, this beak, which is, I believe, always constituted of a horny or chitinous substance, is removed together with all other vestiges of the animal tissues. The presence of a beak also serves to determine in some cases the avicularian nature of the organ, when, as in several species of *Lepralia*, the setose form of the mandible might indicate that it would be more correctly referred to the vibracular type.

1. As regards the *avicularia*.

These organs, which appear to have been first noticed by Ellis, have been investigated and described by many subsequent authors, among whom are particularly to be noticed Mr. Darwin, Dr. Van Beneden, the late Professor John Reid, and especially Nordmann and Krohn.

In some observations upon the structure of the polyzoary and other points in the economy of *Notamia bursaria*, published in the Transactions of the Microscopical Society for 1847, I described more particularly the structure of the curious and unique form presented by the *avicularium* in that Polyzoan, pointing out I believe for the first time, that the muscles were divisible into two distinct sets, one for the closure and the other for the opening of the mandible; I also indicated that the mandible and beak were constituted of a different substance to the rest of the organ, as above adverted to; and that, besides the two sets of muscles, the cup contained a "peculiar body of unknown nature."

I have in addition only to remark that since then it has occurred to me to notice a circumstance hitherto overlooked, and which may eventually serve to throw some light upon the "peculiar body" contained in the cell to which I adverted in my observations on *Notamia*. It was in that species, also, that I first noticed the fact that when the mandible is thrown back, or in other words, when the *avicularium* is open, a slight prominence comes into view, covered with delicate *setæ*, which do not seem

to be of the nature of *cilia*, because they exhibit no motion. These minute *setæ* appear to be seated on the "peculiar body," or at all events to be moved with it, and the latter again seems to be so connected with the muscles by which the mandible is closed, or rather perhaps to a membrane by which the opening of the cell is covered when the mandible is thrown back, as to be protruded simply by the throwing back of that process. The *setæ* then project beyond the level of the cup, and are withdrawn into it as the mandible closes. I have noticed this arrangement at present only in three species of Polyzoa, viz. *Notamia bursaria*, *Bugula plumosa*, and *B. avicularia*. In *Scrupocellaria scruposa*, the only other species that I have had a sufficient opportunity of examining in the living state, I failed in detecting it, and am therefore not prepared to assert that it obtains universally. The *setæ* might be supposed to constitute a tactile organ, the object of which would be to apprise the occlusor muscles of the contact of any minute floating object, upon which the mandible is then suddenly closed.

With respect to the function of the *avicularia*, several circumstances, independent of their conformation, conspire I think to show that they are probably organs of prehension.

Their structure so obviously indicates an aptitude for prehension, that the supposition of such being their function has long been entertained. This prehension of objects may be either for the purposes of defence, or more probably for the procuring of food, for, as Dr. Johnston observes, "although they are too short to hand the prey to the mouth, yet retained in a certain position, and enfeebled or killed by the grasp, the currents set in motion by the ciliated tentacula may then carry it within reach." The prehension of living objects by these organs has been repeatedly observed; and on one occasion I witnessed the capture of a minute vermicule, by two of the *avicularia*, simultaneously, on opposite sides of a branch of *Scrupocellaria scruposa*, and its retention by them for several days, notwithstanding the continued and vigorous efforts of the victim to escape.

With respect to the *vibracula*, I would merely observe, that they consist of a cup containing the muscular apparatus, and of a moveable *seta* articulated to the cup, and which appears to be moved in the same way as the mandible of the *avicularia*. This *seta* is in most cases simple and terete; whilst in others, as for instance generally in the genus *Caberea*, it is toothed on one side; and in others, as in the family *Selenariadæ*, the *seta* is very variously and curiously formed; in some being bifid or trifid at the extremity; and in one, *Selenaria maculata* (Pl. CXVII.), it is spirally contorted and minutely annulated, so as very closely to resemble the proboscis of a butterfly.

As to the function of the *vibracula*, it would appear in most cases to be simply defensive. The *seta* may be observed in almost continual motion, sweeping slowly and carefully over the surface of the polyzoary, and removing what might be noxious to the delicate inhabitants of the cells when their tentacula are protruded.

Another circumstance, however, often to be observed with respect to these organs, is this, that each presents inferiorly a perforation sometimes rounded, as in *Scrupocellaria* and *Canda*, sometimes channelled as in *Caberea*, which indicates the point of attachment of a radical tube or fibre. But that this connexion with a radical tube is not an essential attribute of the vibracular organ, is sufficiently obvious from the circumstance that those tubes are frequently found when no such organs exist; whilst on the other hand, where there *are vibracula*, the tubes invariably enter them, and not the cell itself. This is especially evident in the genus *Canda*.

In the case of the *Selenariadæ* or *Lunulites*, I think it not improbable, as above remarked, that the vibracula may be subservient to locomotion. This point and others would form a most interesting subject of observation to those who may be fortunate enough to obtain these remarkable creatures in the living state.

The *avicularian* and *vibracular* organs appear to be of very considerable importance in a systematic point of view; and although from our imperfect knowledge of them, and, in fact, of many points in the economy and structure of the Polyzoa in general, the supposition can only be regarded as highly problematical, it seems not unlikely that their presence or absence, especially of the *avicularium*, may be connected more directly with the intrinsic nature of the species upon which they are found, than has hitherto been supposed. It may, for instance, be the case that those furnished with these offensive weapons live upon a kind of food different from that of the others, who do not require such an aid in the capture or weakening of their prey. The Polyzoa may, perhaps, thus be divided into vegetable and animal feeders; or into feeders upon dead, and those which subsist upon living organisms. One thing, however, may be affirmed, that these organs afford, in many cases, excellent and available systematic characters, of which application of them the preceding Catalogue will afford abundant evidence; with respect to this part of the subject it will therefore be unnecessary here to add more than a few words.

Of the two sets of organs, the *avicularia* are found by far the most extensively; existing in fact in the majority of genera constituting the cheilostomatous Polyzoa. In employing

these appendages for the purpose of classification it is necessary to subdivide them into three classes: 1. the *pedunculate*; 2. the *sessile*; 3. the *immersed*. the two latter classes, however, run insensibly into each other, whilst the pedunculate form is obviously quite distinct, inasmuch as it presents an additional member in the form of a basal joint. It is to this form of avicularium that the term "bird's" or "vulture's' heads" is more properly applied. It occurs in *Bugula avicularia, B. plumosa, B. flabellata, B. dentata,* and in *Bicellaria ciliata*; whilst it is wanting altogether in *Bugula neritina, Bicellaria grandis* and *B. gracilis,* species therefore which it is very desirable should be examined in the living or fresh state, for the purpose of determining whether the inhabitant of the cell does not afford characters sufficient to cause these species to be referred to genera distinct from those to which, from consideration of their skeletons alone, they are now regarded as belonging. A modification of pedunculate *avicularium*, where it assumes the form of a long trumpet-shaped or infundibuliform organ, exists in *Bicellaria tuba.* With the exception of this latter form, the pedunculate *avicularia* are always placed on the anterior aspect of the cell, on one side below the level of the aperture.

The *sessile* form of *avicularium,* distinguished from the *immersed,* is pretty extensively met with, though it does not occur so abundantly as the latter form. With a single exception (*Amastigia nuda*, Pl. XXXVI.), this form of avicularium is almost invariably placed upon the front of the cell below the aperture, as in *Alysidium Lafontii* (Pl. XIV.), most species of the genera *Menipea, Scrupocellaria* and *Canda,* and in many of the genus *Caberea*; in some, as in *Scrupocellaria ferox* (Pl. XXII.), attaining gigantic dimensions. It is distinguished from the immersed form of *avicularia,* not only by its greater projection, but also, and perhaps more essentially, by its being composed of a more or less flexible material; whilst in the latter form, even where it is somewhat prominent, the cup is always calcareous and rigid.

The *immersed* form of avicularium occurs in a great number of genera and species, and in many instances, as in the genus *Lepralia,* affords excellent specific characters. The variety of appearances and position assumed by this form of *avicularium* will be best appreciated upon inspection of the figures, especially of the genera *Catenicella, Scrupocellaria, Menipea, Caberea, Lepralia, Cellepora, Eschara, Retepora, Emma, Salicornaria* and *Flustra.* In *Diachoris crotali, Notamia bursaria* and *Bicellaria tuba,* the avicularium presents such an aberrant conformation, that it can scarcely be arranged in either of the above categories. That of *Diachoris crotali* and *Bicellaria tuba,* how-

ever, may I think be placed with the pedunculate form, and that of *Notamia* with the sessile or immersed variety.

To show the extent in which organs either avicularian or vibracular exist in the cheilostomatous Polyzoa, a list is subjoined of those genera and species contained in the present Catalogue, in which I have noticed the existence either of *avicularia* or *vibracula* or of both:

1. *Species possessing avicularia.*

Those marked with an asterisk * also have vibracula.

1.	Alysidium	1 spec.
?*2.	Amastigia	1 „
3.	Bicellaria	2 „
4.	Bugula	5 „
*5.	Caberea	4 „
6.	Calpidium	1 „
*7.	Canda	2 „
8.	Carbasea	2 „
9.	Catenicella	17 „
10.	Cellepora	8 „
11.	Emma	2 „
12.	Eschara	11 „
13.	Flustra	5 „
14.	Lepralia	24 „
15.	Membranipora	10 „
*16.	Menipea	6 „
17.	Notamia	1 „
18.	Retepora	3 „
19.	Salicornaria	4 „
*20.	Scrupocellaria	7 „
		116 „

2. *Species having vibracula only.*

1.	Cupularia	5 „
2.	Lunulites	4 „
3.	Selenaria	1 „
		10 „

from which it appears that of thirty-six genera, twenty include species armed in the one way or other; and that of 191 species, no less than 126 are furnished with *avicularia* or *vibracula*;—a circumstance in itself sufficient to demonstrate the importance of these organs in a systematic history of the Polyzoa.

G. B.

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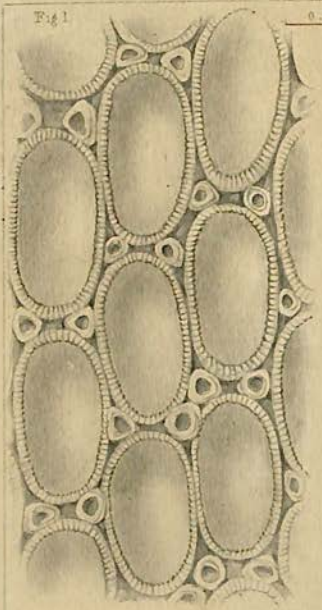

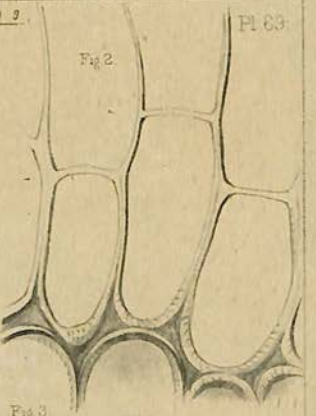

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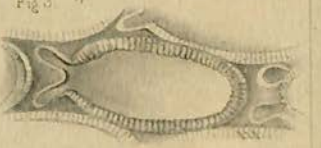

Fig 5

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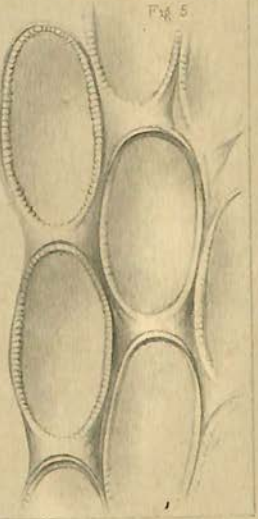

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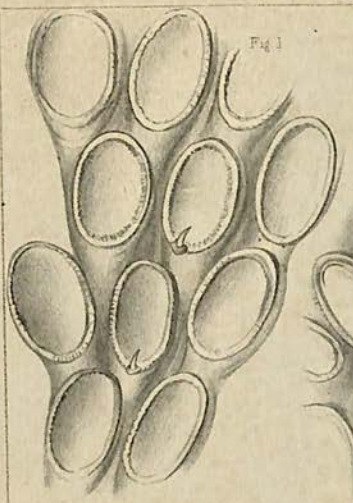

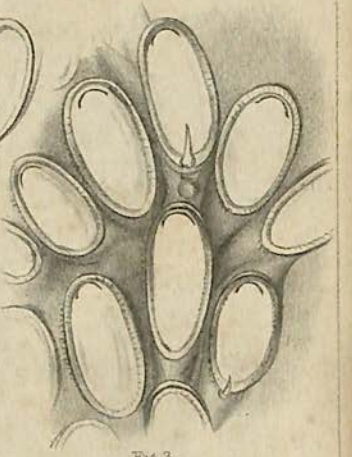

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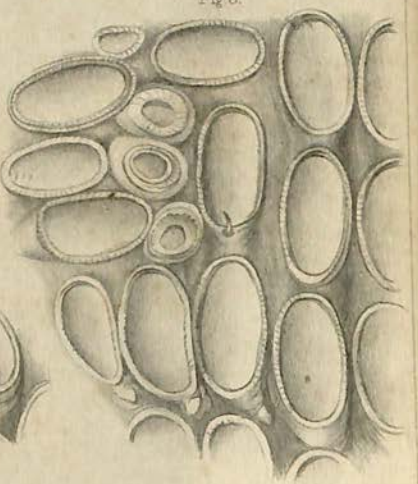

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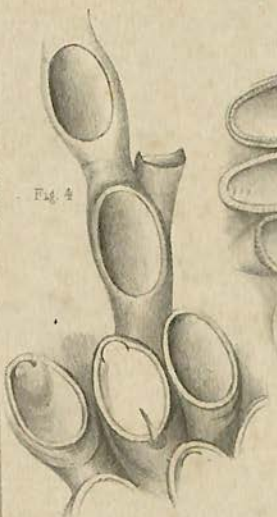

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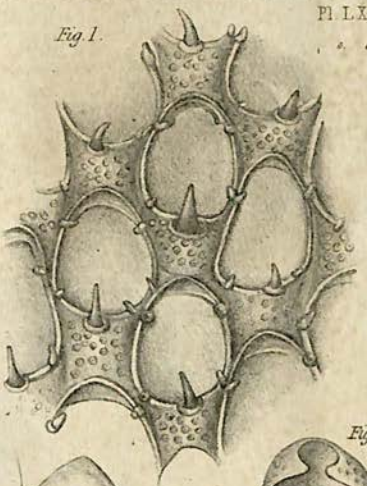

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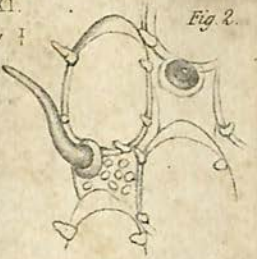

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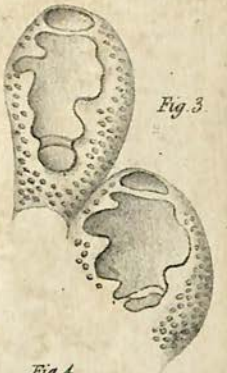

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Fig. 6.

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Fig 1

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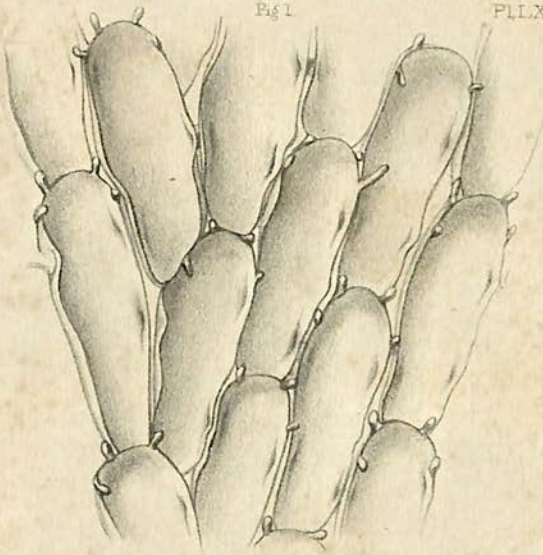

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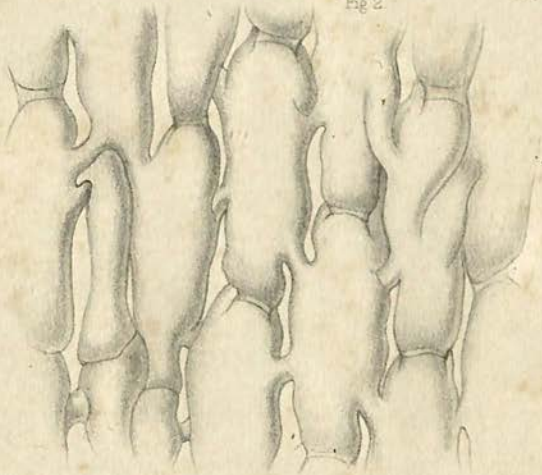

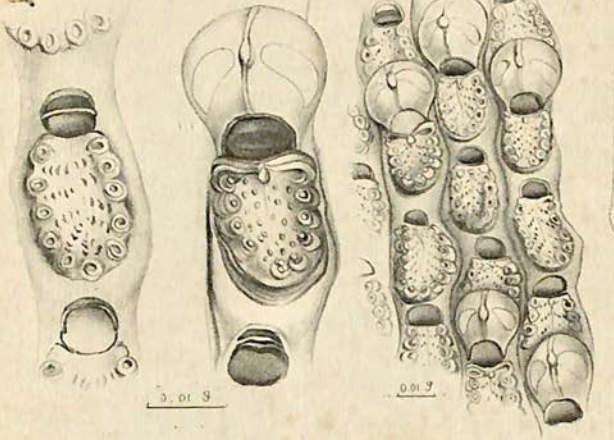

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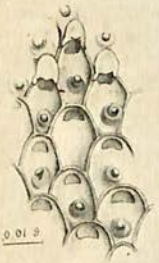

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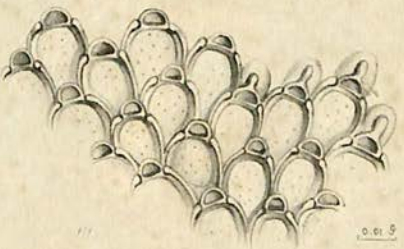

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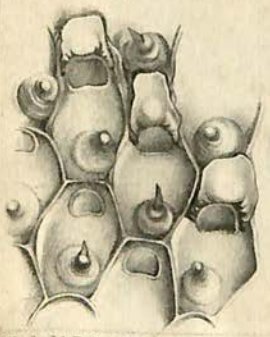

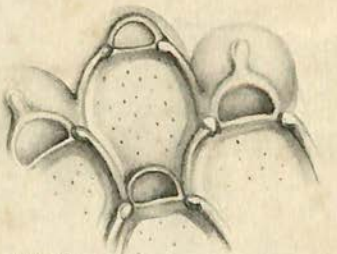

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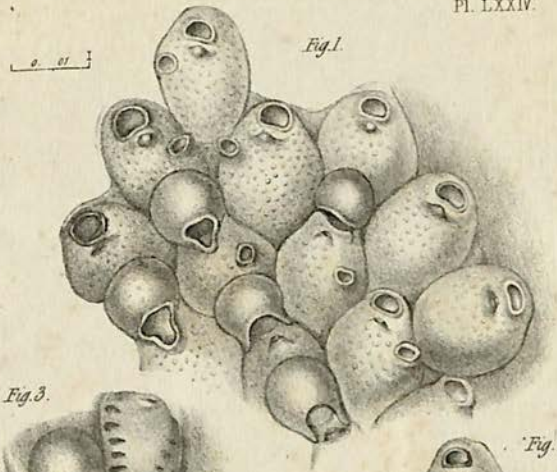

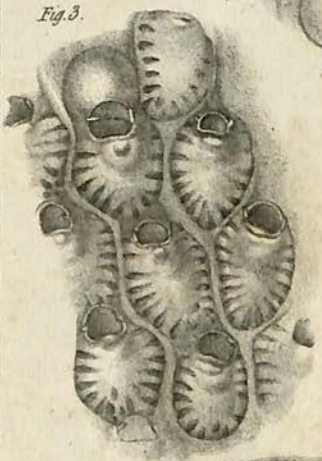

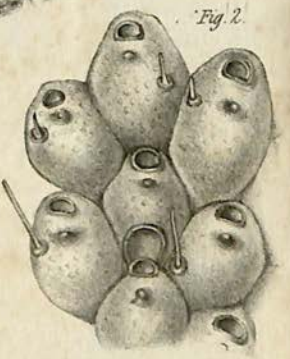

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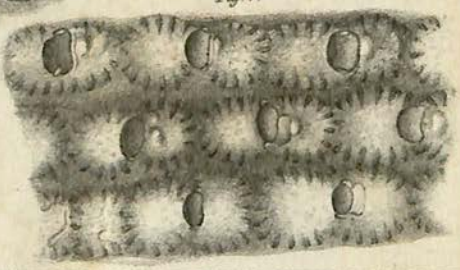

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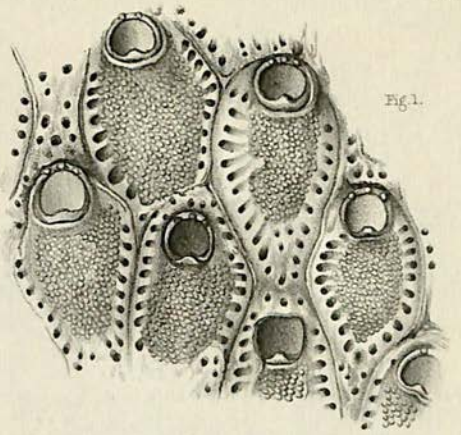


Fig. 1.

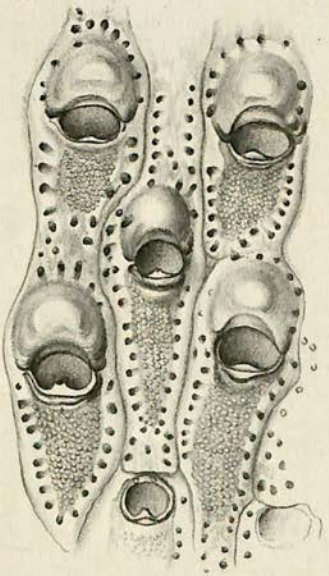


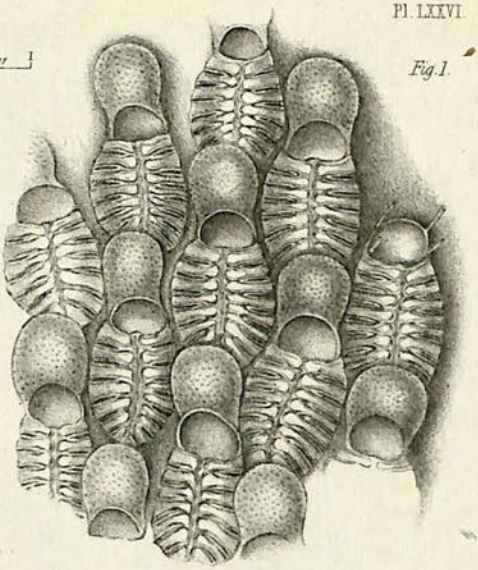
Fig. 2.

Fig. 3.

G. Bunk, del.

Achilles, lith.

Fig.1.



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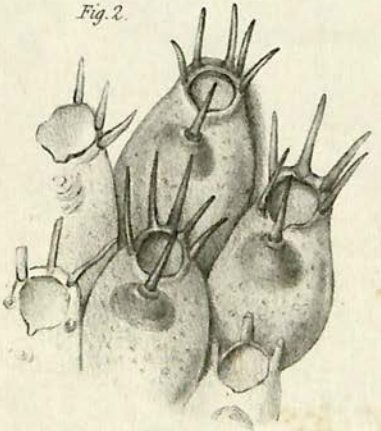

Fig.3.

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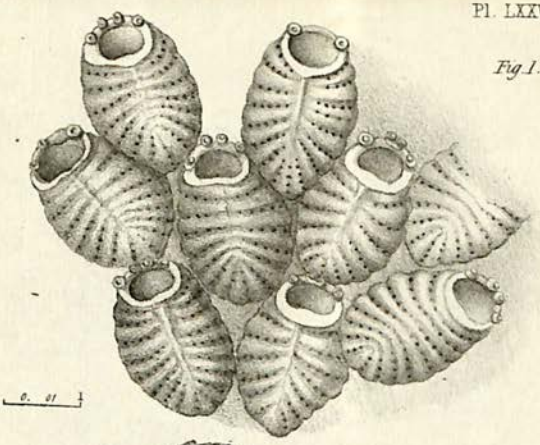

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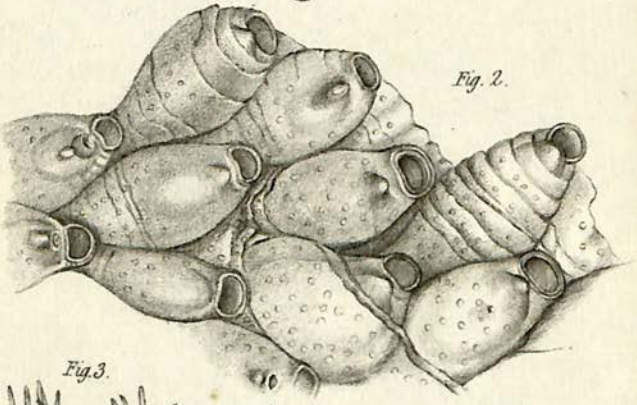

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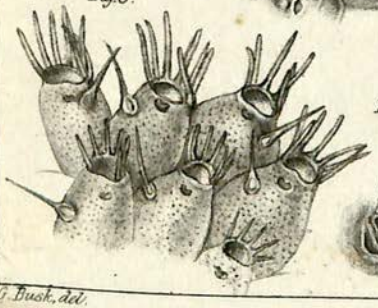


Fig. 4.

Fig. 5.

G. Busk, del.

W. H. Baily, lith.

Fig 1

a at 3

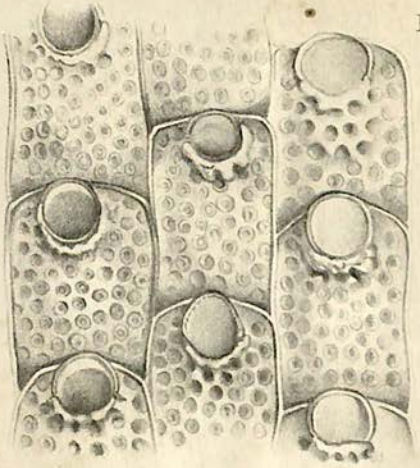


Fig 2

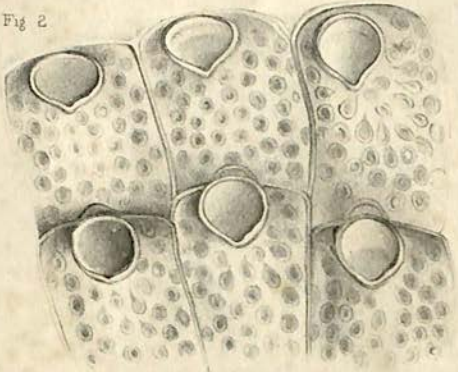
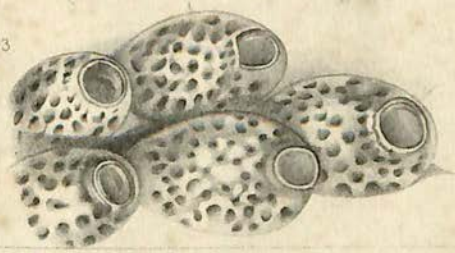


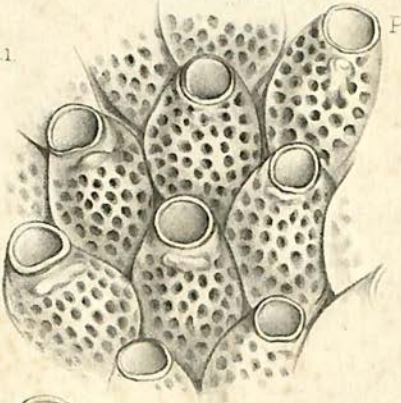
Fig 3



G Busk, del. B. George lith.

Pl LXXIX

Fig 1.



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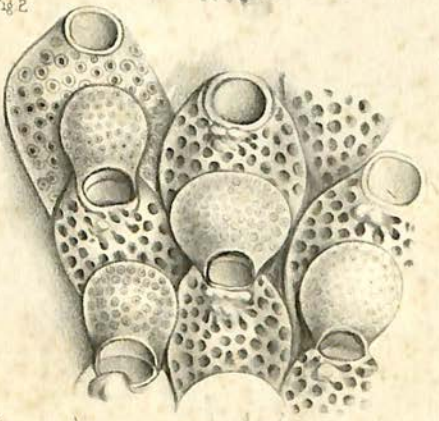

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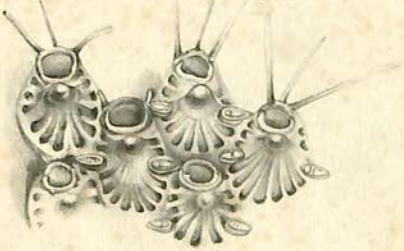


G Bunk del H George lith.

Pl LXXX

Fig 2.

0.01 9

Fig 1

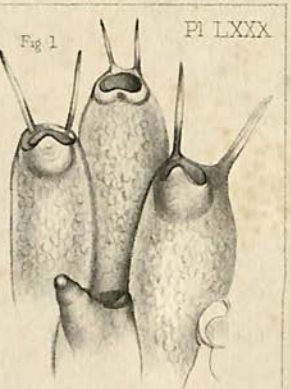


Fig 3.

Fig 5

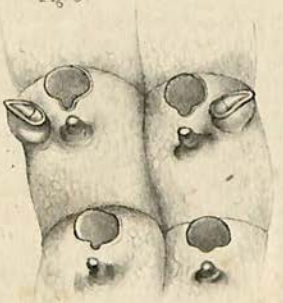
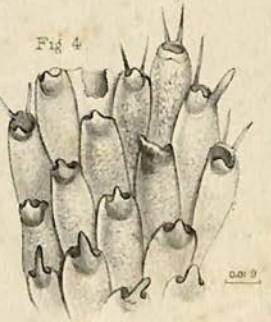
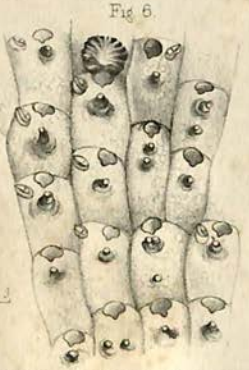


Fig 4



0.01 9

Fig 6.



0,01 9

Fig 7

0.01 9

C Bunk del B

Fig.1.

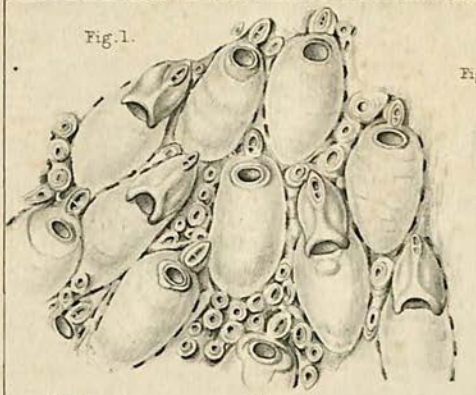


Fig.4.

Fig.3.

Fig.2.

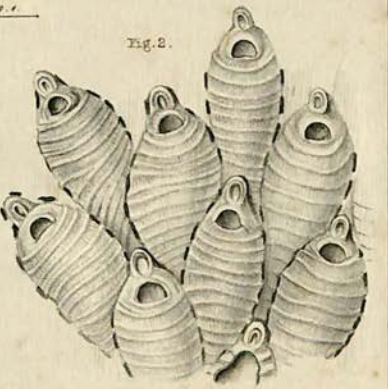


Fig.5.

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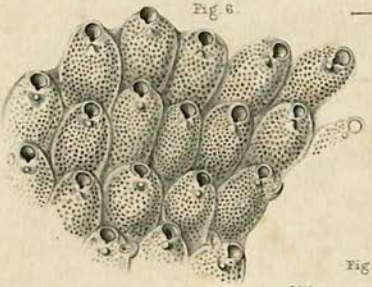

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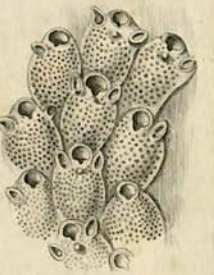


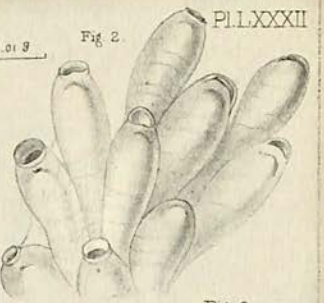
G.Buckeridge. Achilles lith.

Ford & West, imp.

Fig. 1.

0.01 3

Fig. 2.



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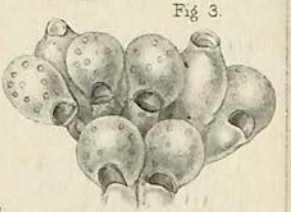

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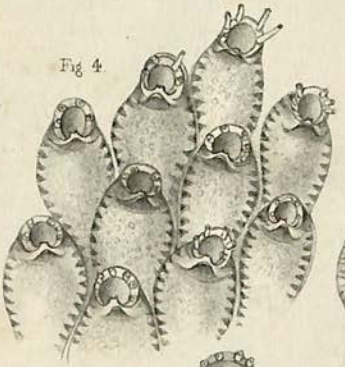

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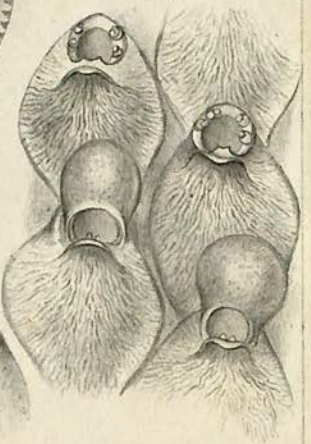

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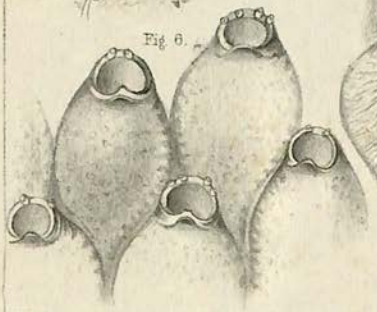
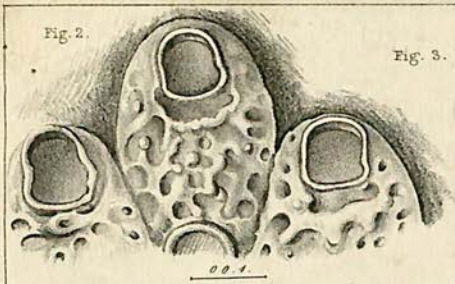


G. Busk, del.

Ford & West, Imp. 54, Hatton Garden.

Fig. 2.



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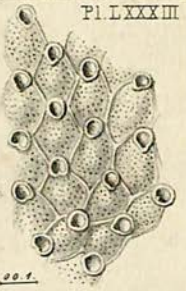

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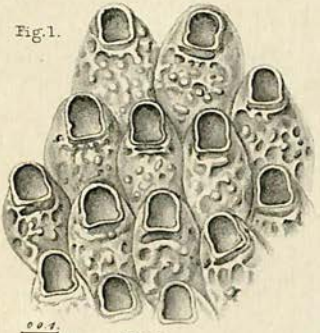

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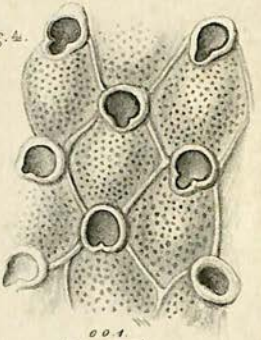

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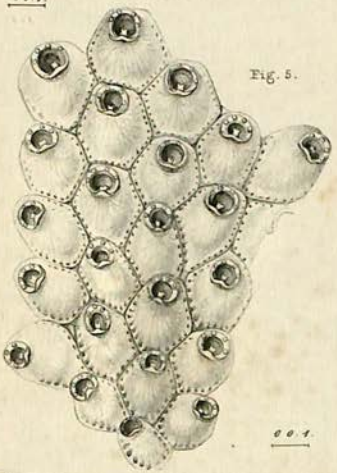


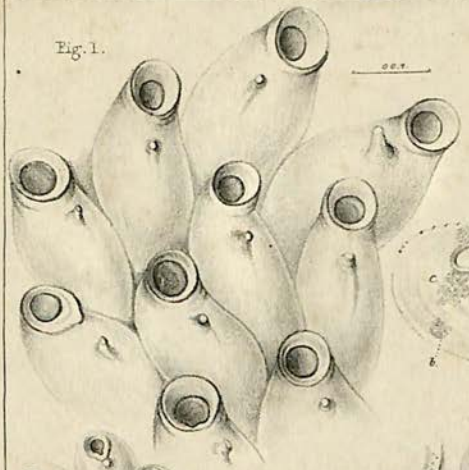
0.01.

Fig. 6.

0.01.

G. Buck del. Achilles lith. Ford & West, imp.

Fig. 1.



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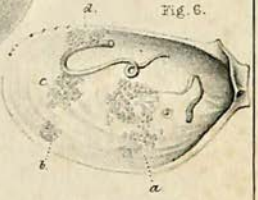


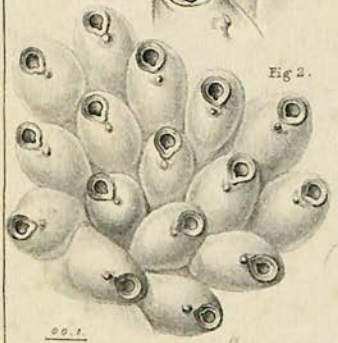
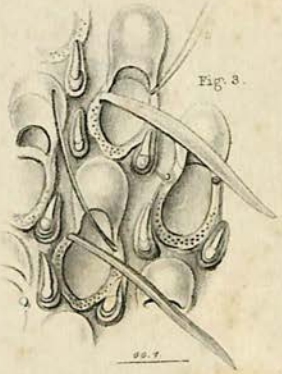


Fig. 2.

Fig. 3.



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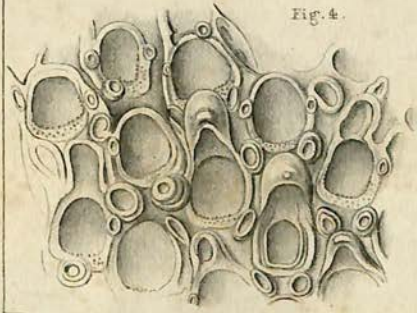


Fig. 5.

G. Bunk. del. Achilles, lith. Ford. & West, imp.

Fig. 2.

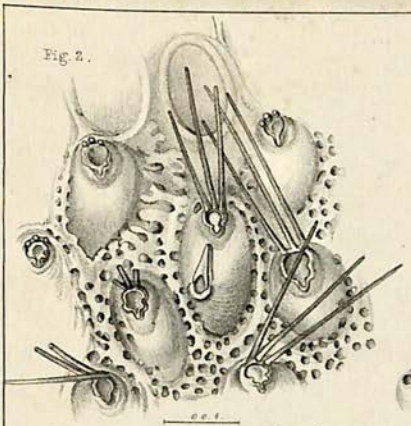
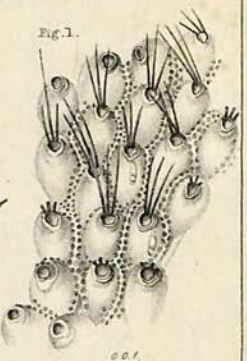
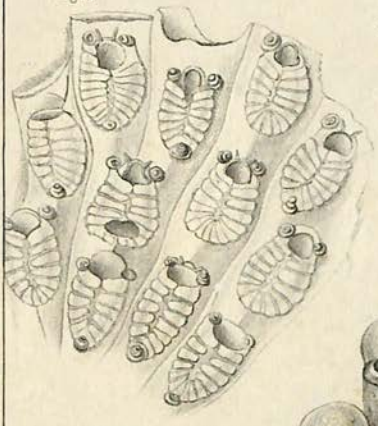


Fig. 1.



L. trispirosa.

Fig. 3.



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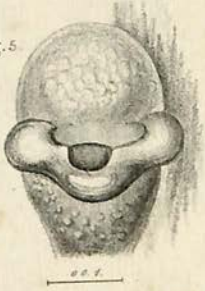


L. melolontha

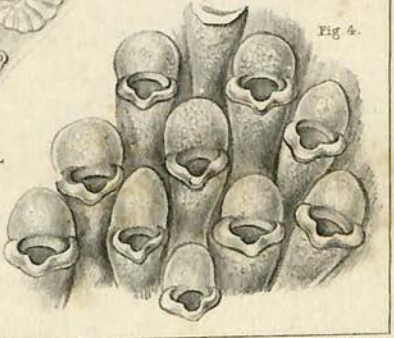


Fig 4.

L. labiosa.

C. Rusk del. Achilles, lith. Ford. & West, imp.

Fig. 1.

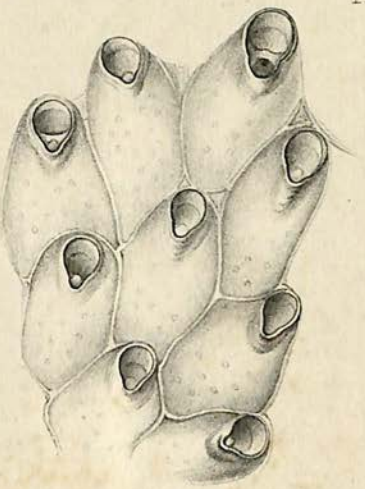


Fig. 2.

Fig. 3

0.0.1

G. Buck. del. Achilles, lith. Emitt. & West. imp.

Fig. 2.

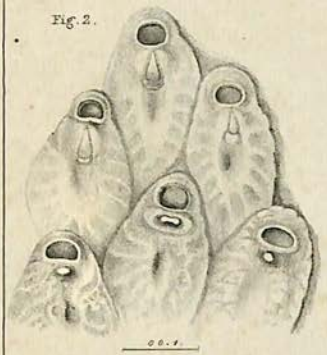


Fig. 1.

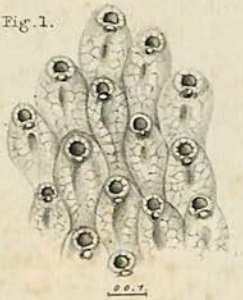
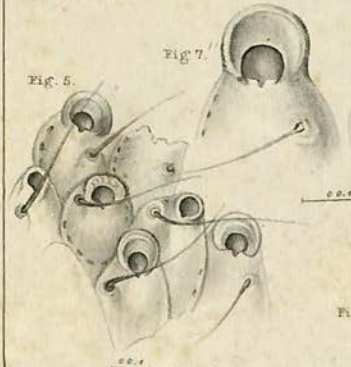


Fig. 3.

Fig. 4.

Fig. 7.

Fig. 5.



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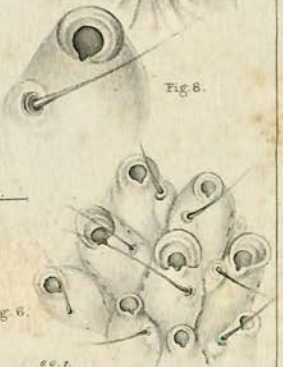
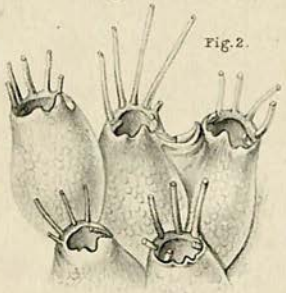


Fig. 6.

G. Busk, del. Achilles, lith.

Ford & West, imp.



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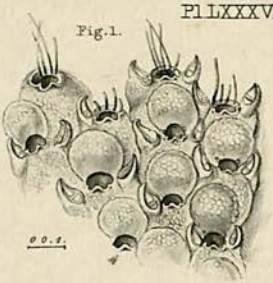

Fig.1.

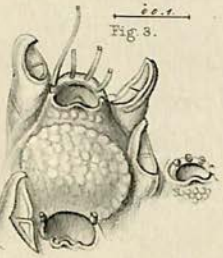

Fig.3.

Fig.7.

Fig.8.

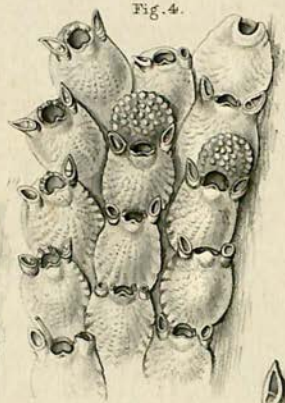

Fig.4.

Fig.5.

Fig.6.

G. Buck, del. Achilles, lith. Bowl & West, imp.

Fig. 2.

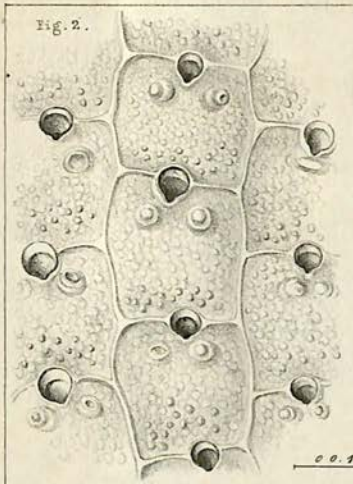

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Fig. 5.

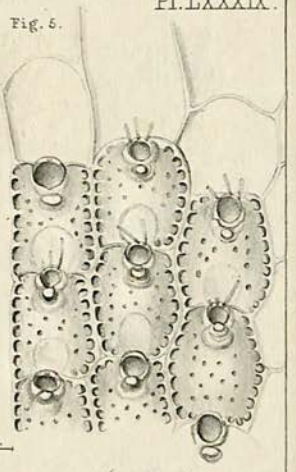

Fig. 1.

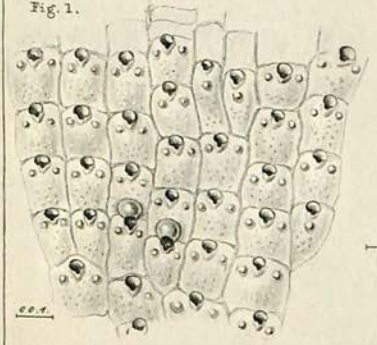

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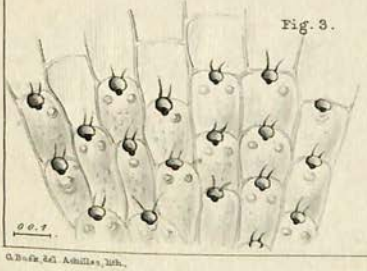
Fig. 6.

0.0.1.

Fig. 3.



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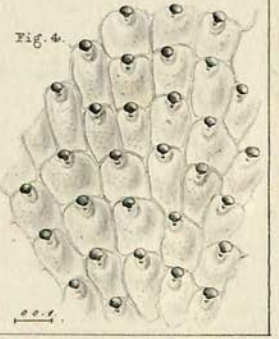

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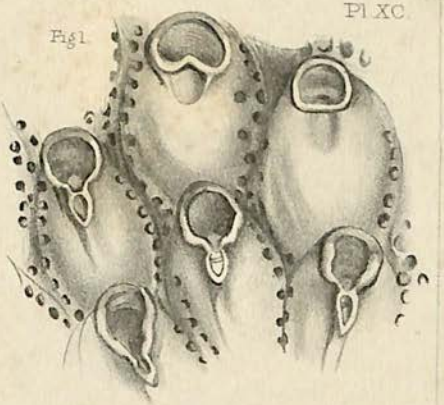
G. Bodle, del. Achilles, lith.

Ford. & West. imp.

Fig 4

Fig 1



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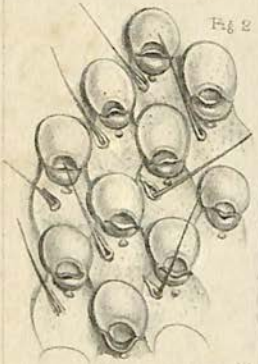

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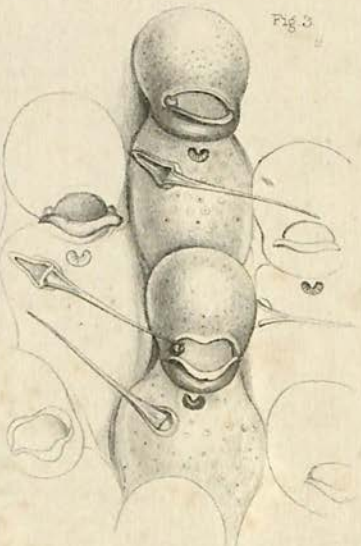
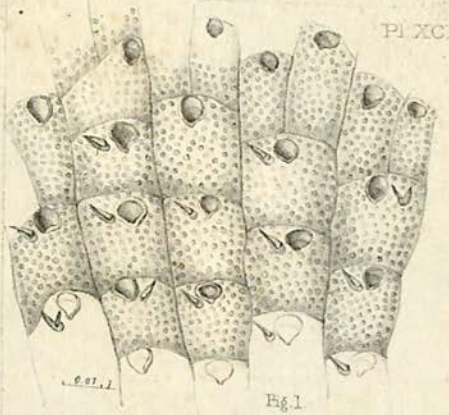


Fig 6

Fig 5

Hanhart, Lithographers, Bd. Haussmann, Genève.

Pl. XCI.



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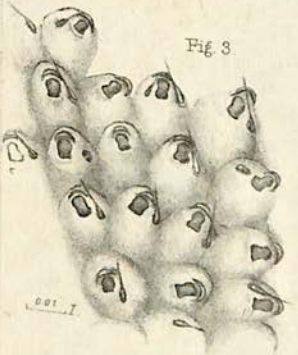

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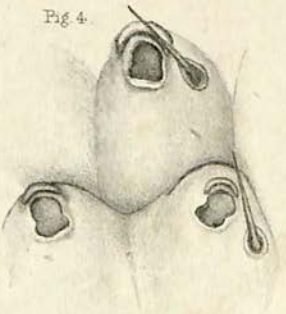

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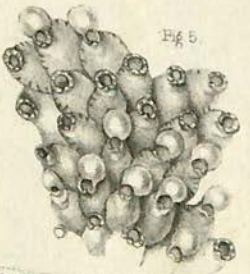


Fig. 5.

Fig. 6.

C. Heath, del. et lith.

Ford & West, Imp.

Pl. XCII.

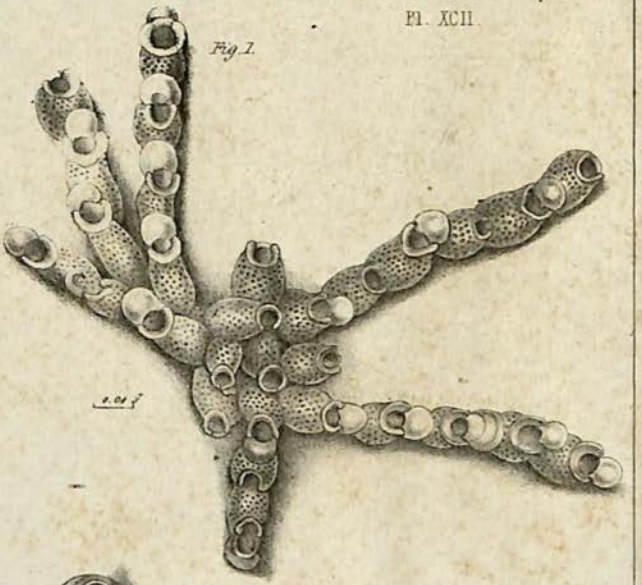


Fig. 1.

0.04 f

Fig. 3.

0.01 f

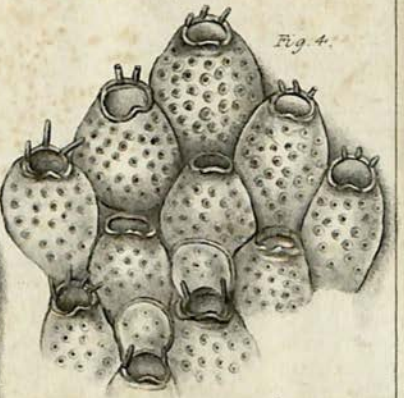


Fig. 4.

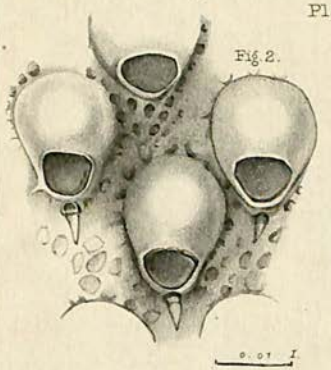
Fig. 2.

G. Busk, del.

W. H. Baily, lith.

Pl. XCIII.

Fig. 2.



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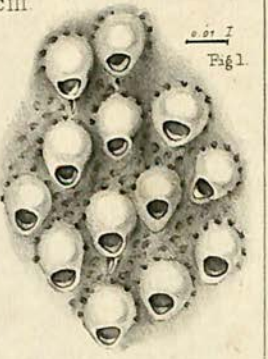

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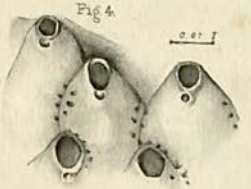

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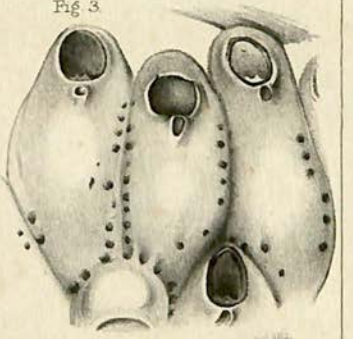

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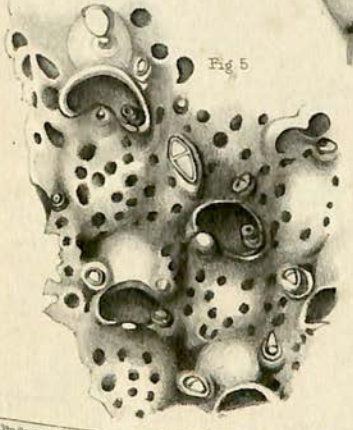

Fig. 6.

G.Bush del. C.H. Bonelph.

Publ. by West, Ing.

Pl. XCIV

Fig. 1.

Fig. 2.

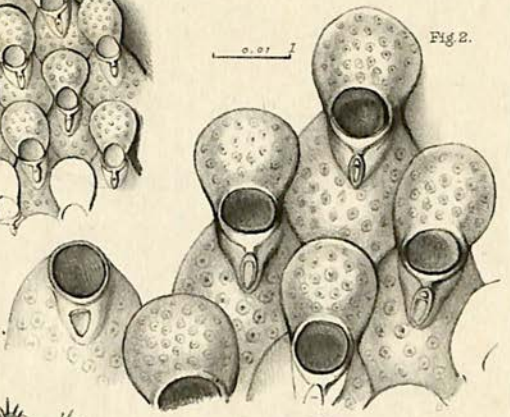

Fig. 3.

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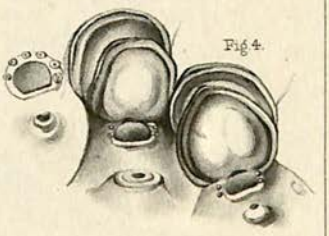

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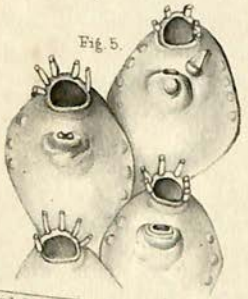

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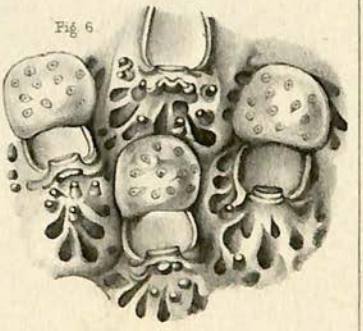

G.Brook. del. C.P. Rose lith.

Ford & West. Imp.

Pl. XCV.

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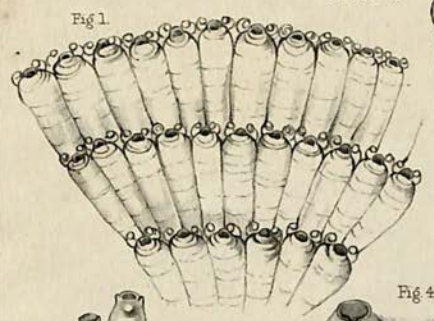


Fig 2.

Fig 5.

Fig 4.

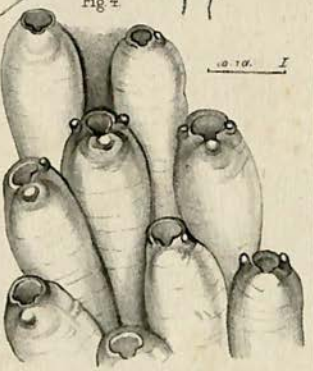
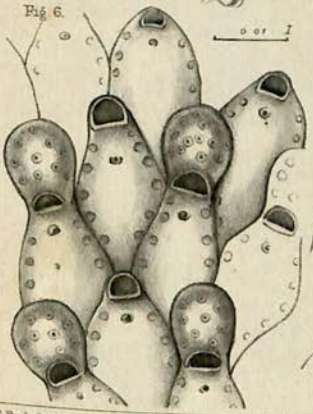


Fig 3.

Fig 6.



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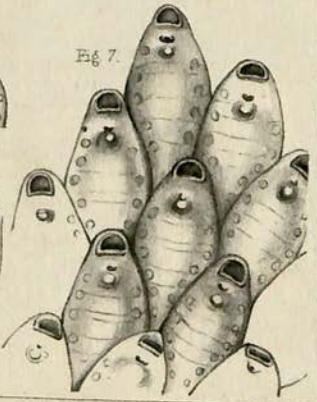

G.Brook, del. C.R. Bone, lith.

Ford & West, Imp. 54, Hatton Garden.

Pl. XCVI.

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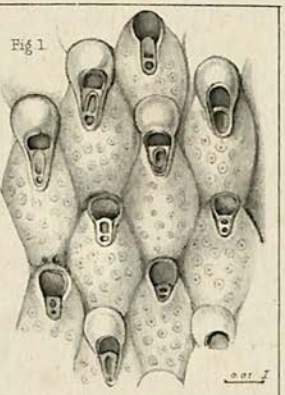

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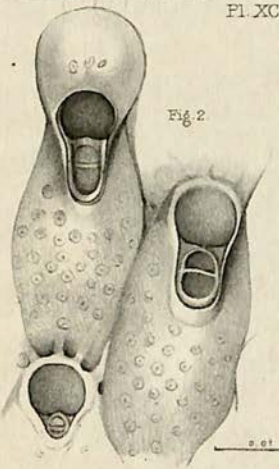

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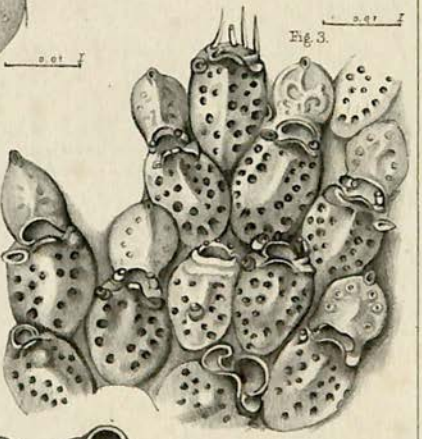

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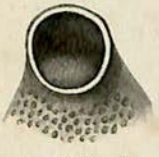

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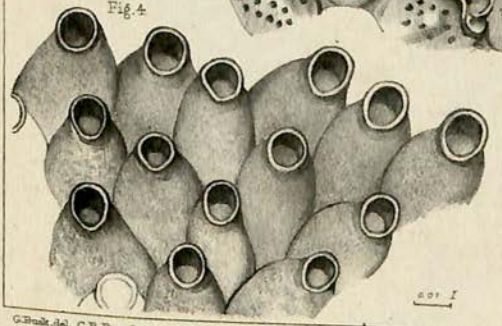


G. Brady, del. C.R. Bone, lith.

Ford & West, Imp.

Pl. XCVII.

Fig. 1.

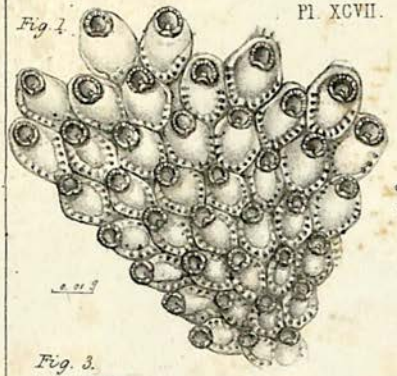
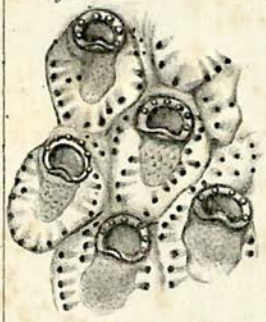


Fig. 2.

Fig. 3.



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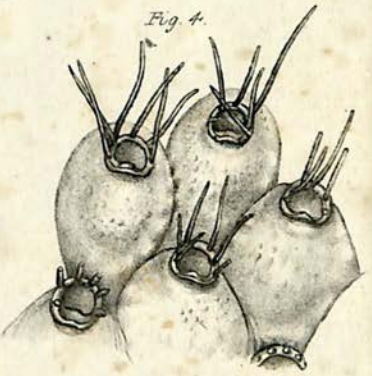

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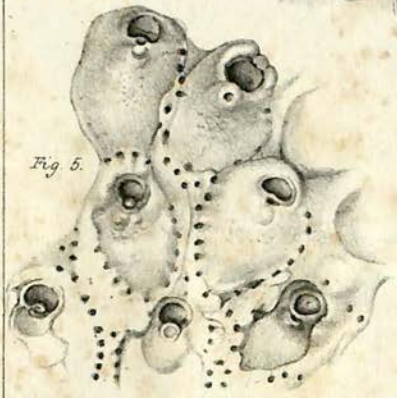


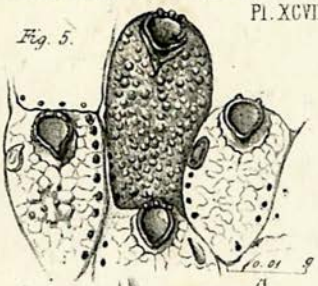
Fig. 6.

G. Busk, del.

W.H. Baily, lith.

PL. XCVIII.

Fig. 5.



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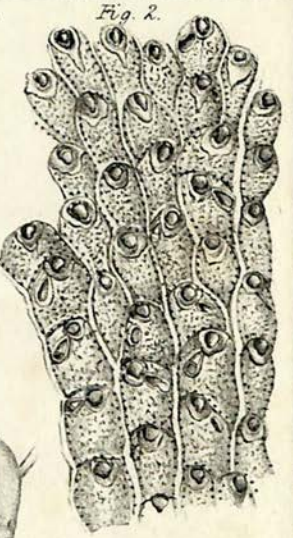

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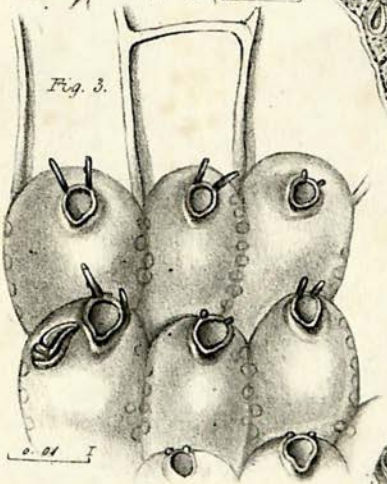

Fig. 4.

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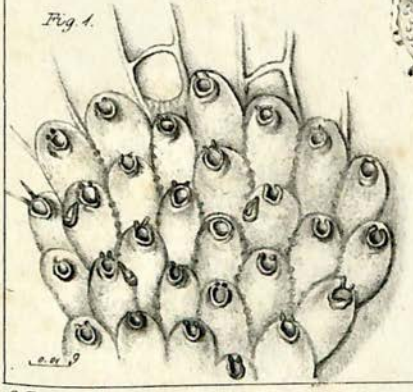

G. Busk, del.

W.H. Baily, lith.

Pl. XCIX.

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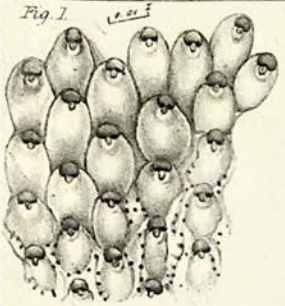

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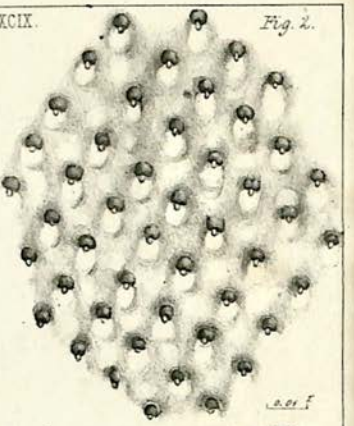


Fig. 3.

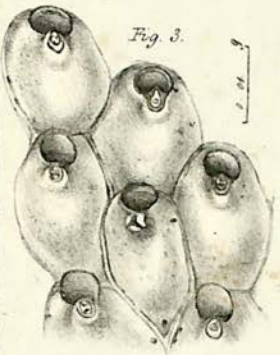
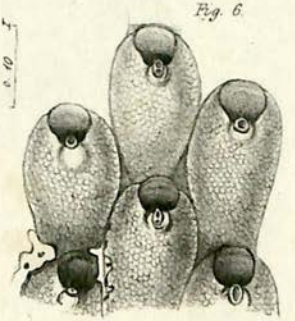


Fig. 4.

Fig. 5.

Fig. 6.



G. Busk, del.

W. H. Baily, lith.

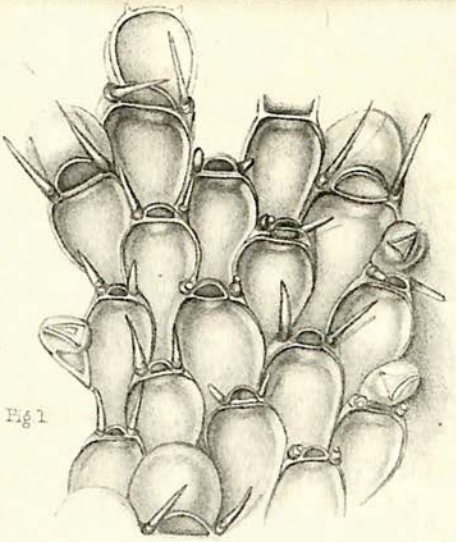


Fig 1.

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Fig 2.

Fig 3.

Forell & West, Imp

Fig. 2.

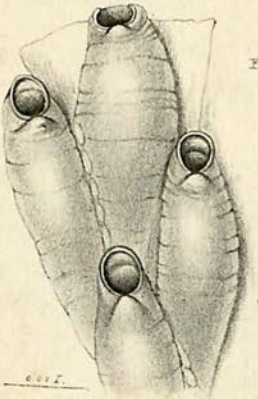
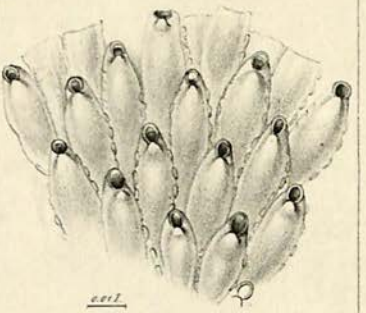


Fig. 1.



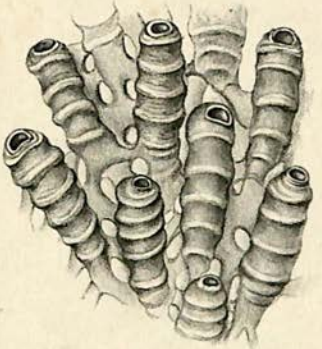


Fig. 3.

Fig. 4.

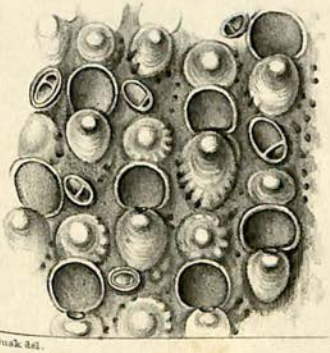


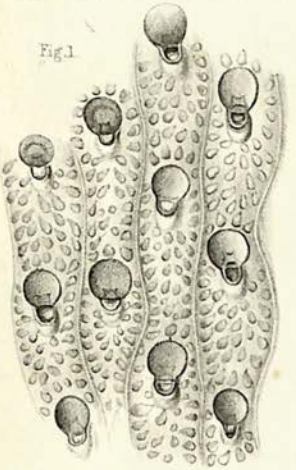
Fig. 5.

Fig. 6.

G. Busk del. Achilles, lith.

Pl. CII.

Fig. 1.



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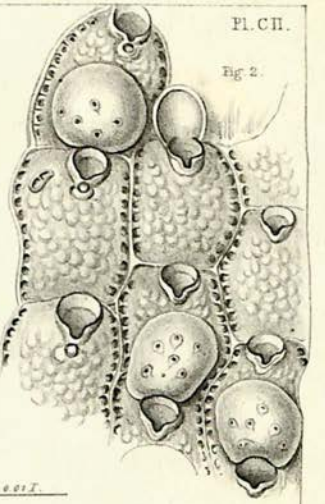
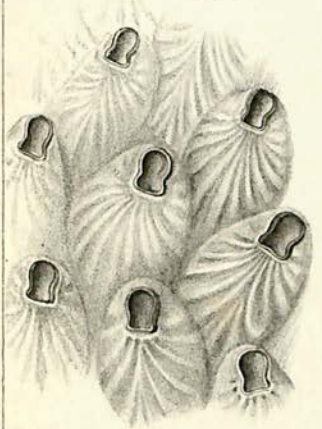


0.01 I.

Fig. 4.



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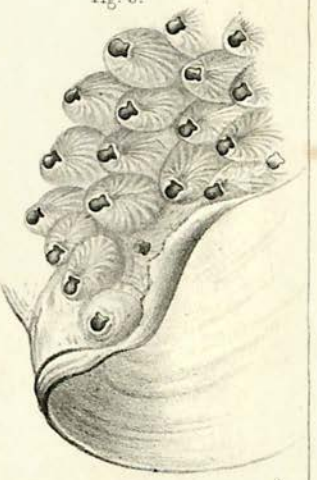

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Pl. CIII.

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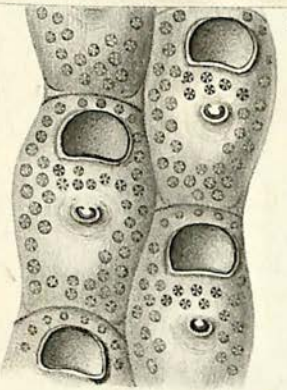

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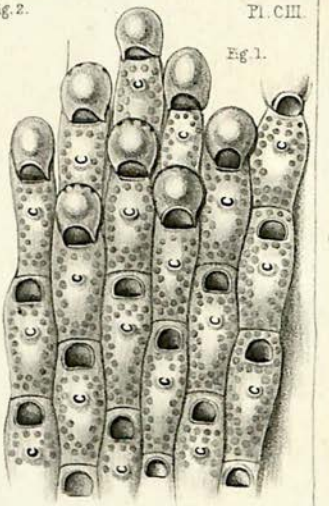

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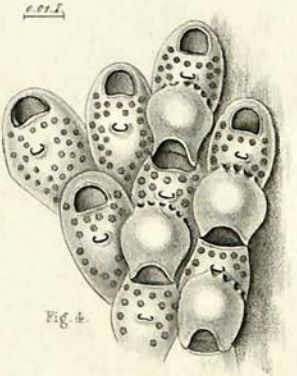

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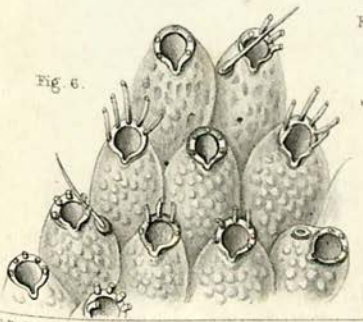

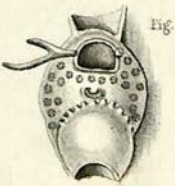

Fig. 5.

G. Basile del.

Achilles lith.

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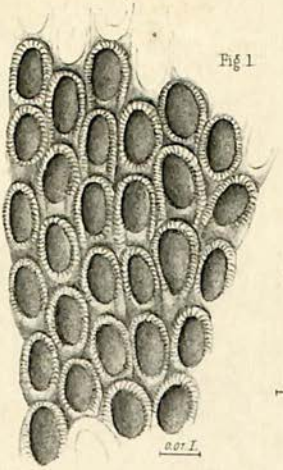

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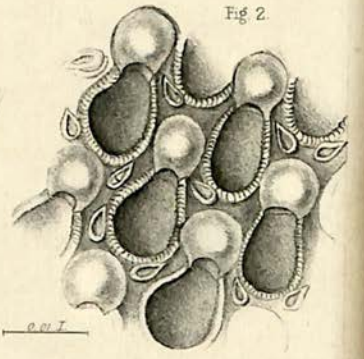

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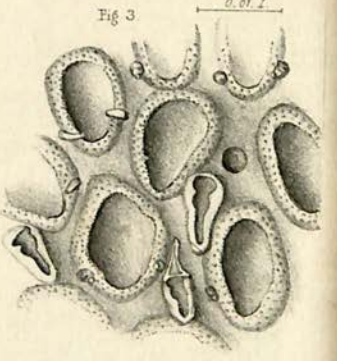

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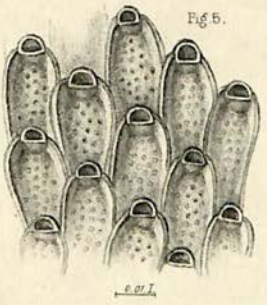

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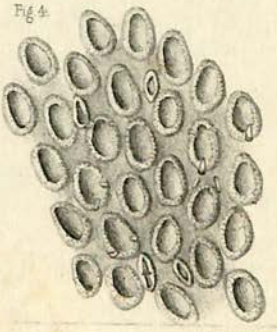
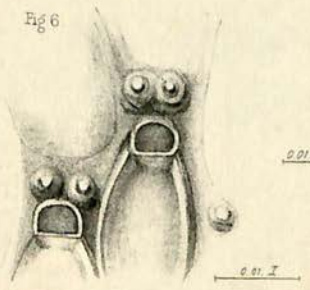


Fig 6



G. Busk del. et lith.

Ford & West, Imp.

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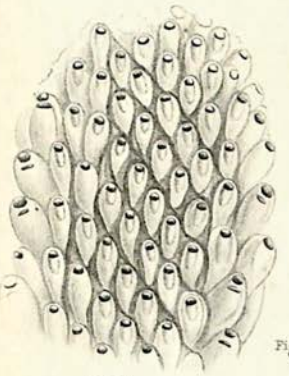

Fig. 2.

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Fig. 3.

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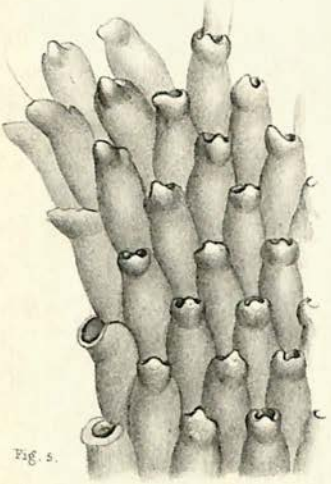

Fig. 5.

0.01 I.

Fig. 6.

0.01 I.

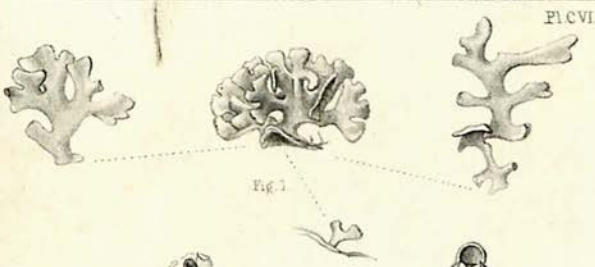

Fig. 1.

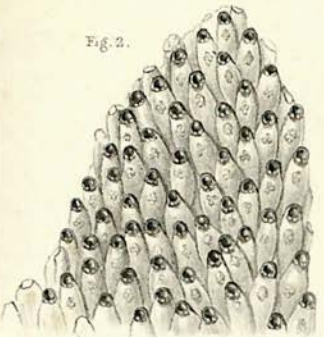

Fig. 2.

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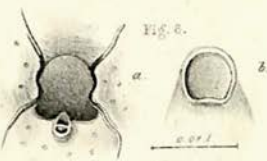

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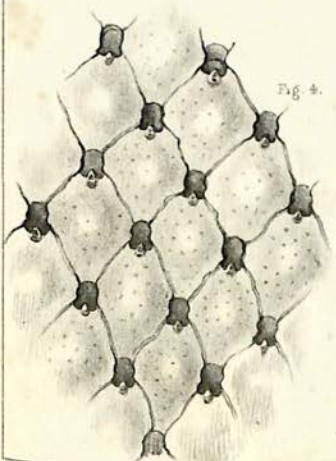

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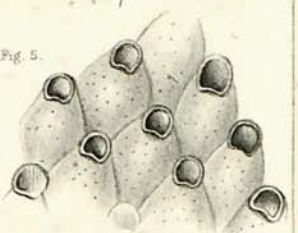


Fig. 5.

Fig. 7.

PL.CVII.

Fig.1.

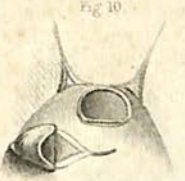
Fig. 3

Fig 6.

Fig. 7.

Fig. 4

Fig. 10.



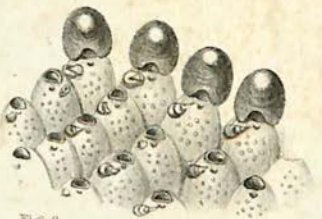


Fig. 8.

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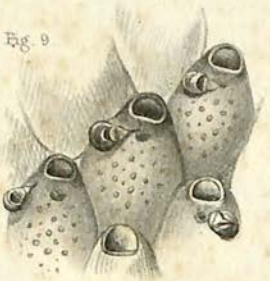


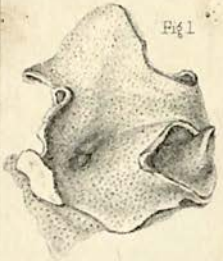
Fig. 9

Fig. 2.

G. Busic del.

Achilles lith.

Fig 1



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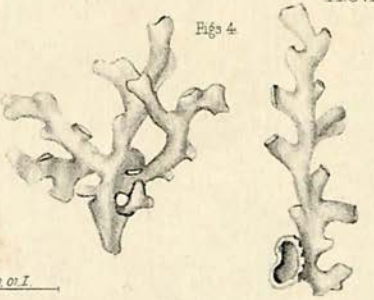

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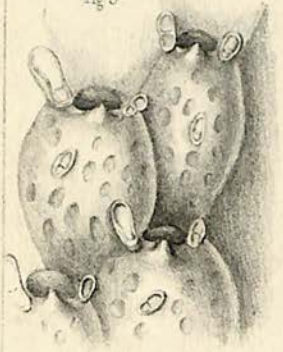
Fig 3



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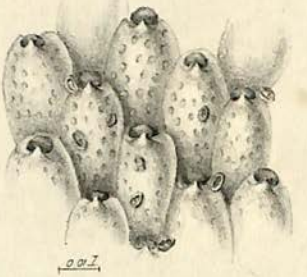

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Fig 6

0.01 I.

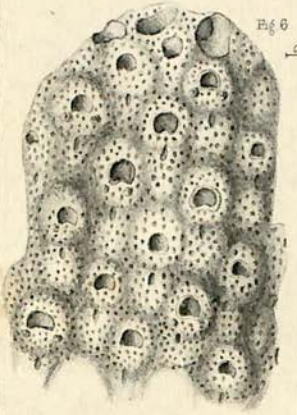
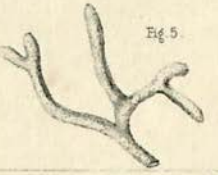


Fig 7

0.01 I

Fig 5.



G. Bauk, del. et lith.

Ford & West., Imp.

Pl CIX

Fig 1.

Fig 2.

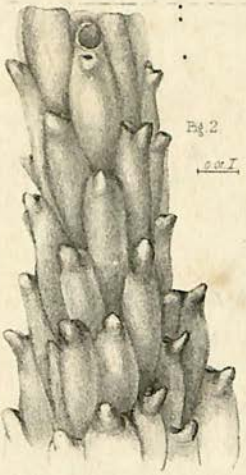


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Fig 3.

0.01 I

Fig 4.

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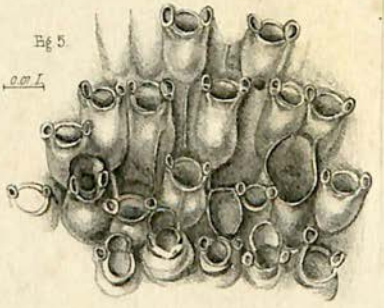

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Fig 6

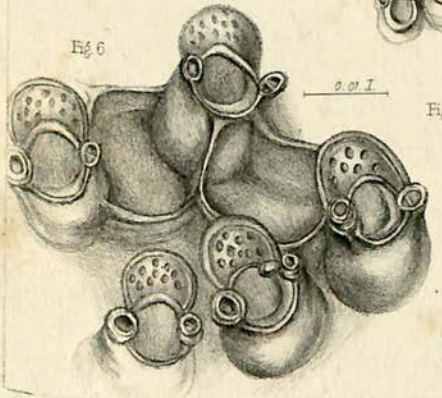

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Fig 7

G Brook, del. et lith.

Ewd & West, Imp 54, Hatton Garden.

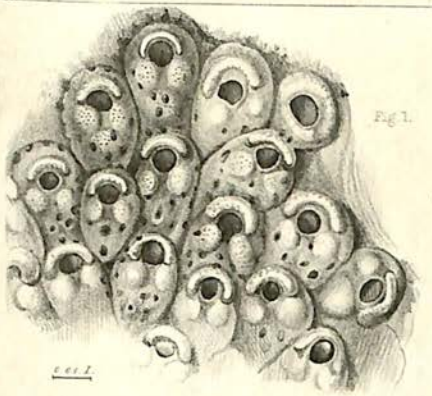
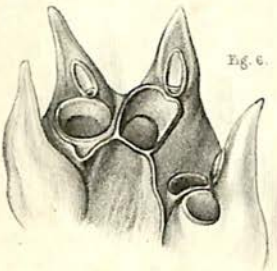


Fig. 1.

c. et I.

Fig. 2.

c. et I.



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c. et I.

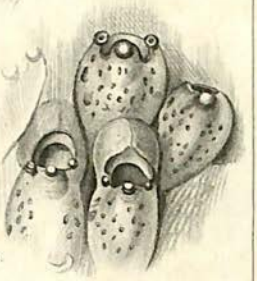


Fig. 3.

c. et I.

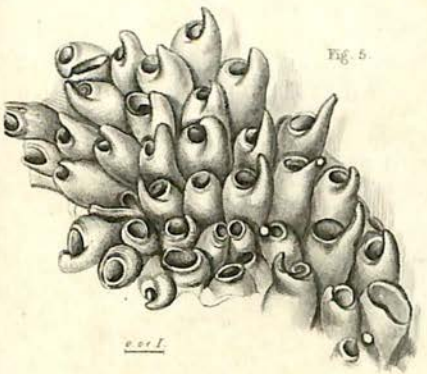


Fig. 5.

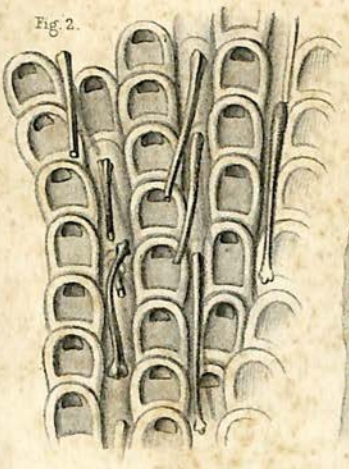
c. et I.

Fig. 4.

Fig. 1.

Fig. 4.

Fig. 2.



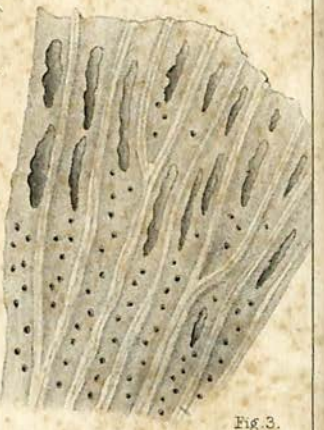


Fig. 3.

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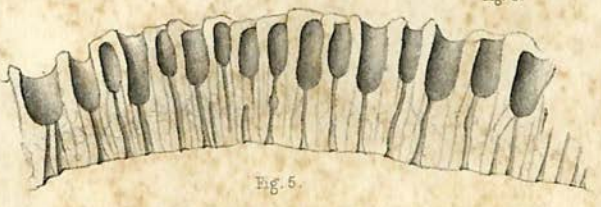

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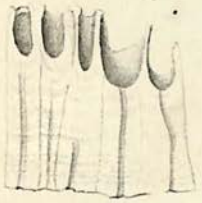

Fig. 5.

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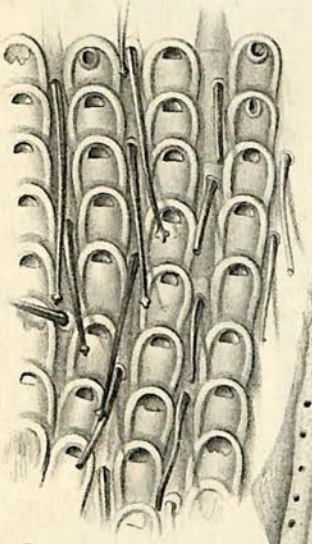
Fig. 4.



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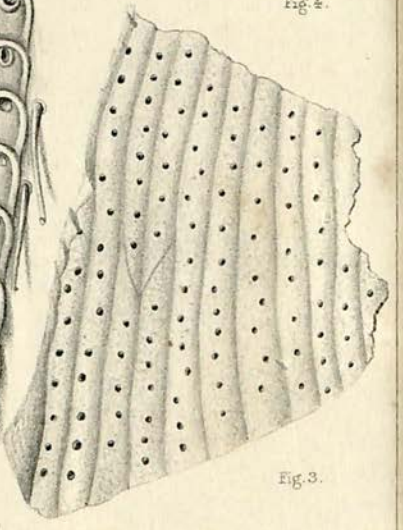

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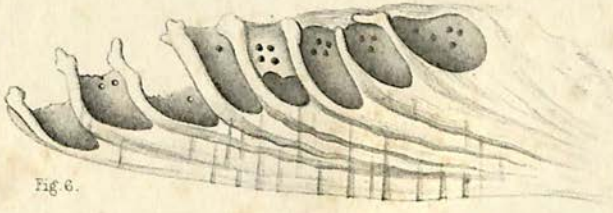

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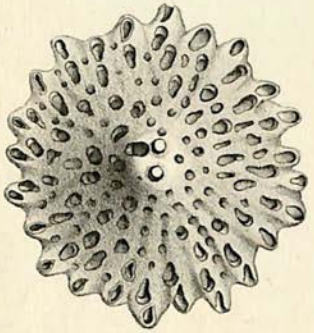

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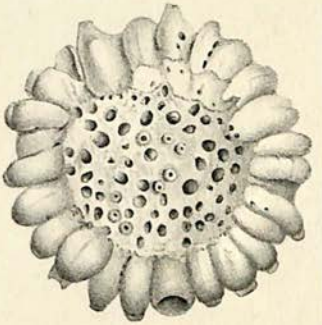

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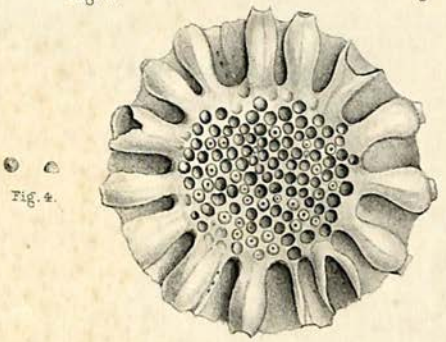
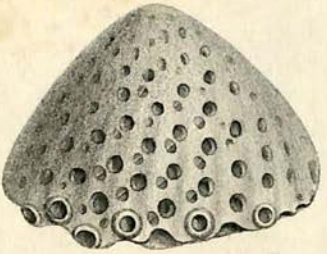


Fig. 4.

Fig. 1.

Fig. 6.



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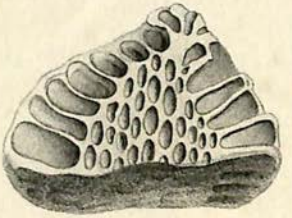

Fig. 7.

G. Buck del. Achilles lith.

Fig. 1.

Fig. 2.

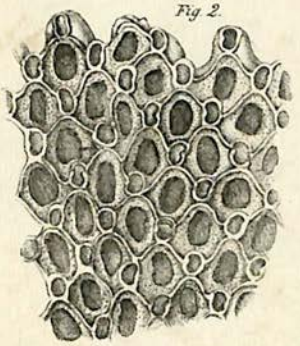

Fig. 3.

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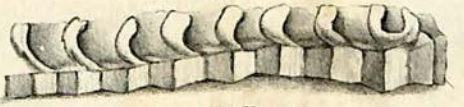

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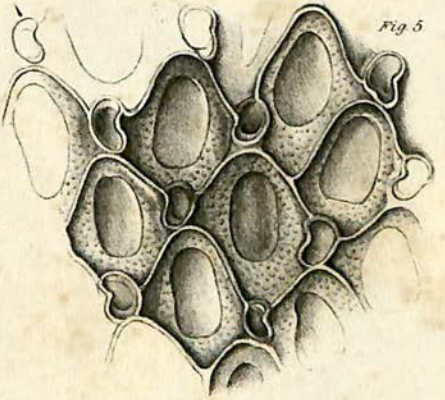

Fig. 1.

Fig. 2.

Fig. 3.

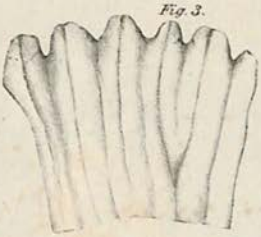

Fig. 4.

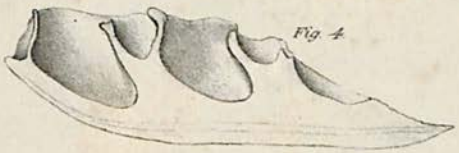

Fig. 5.

Fig. 1.

Fig. 2.

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Fig. 3.

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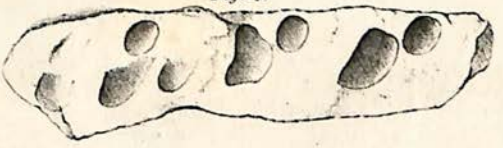
Fig. 4.



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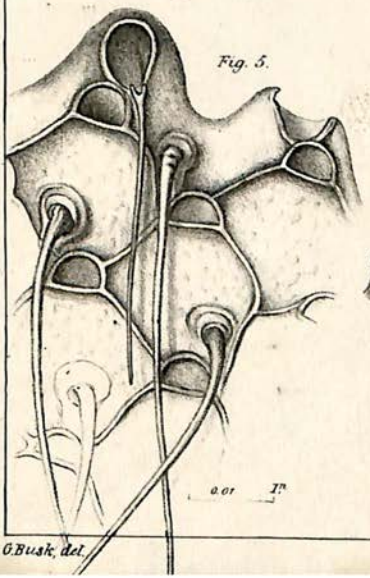

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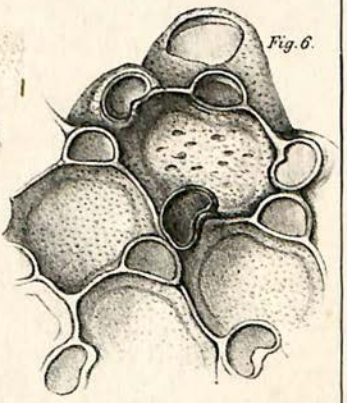
Fig. 6.



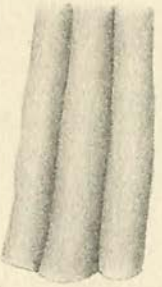
0.01 In.

G.Busk, del.

W.H.Baily, lith.

Fig. 1.

Fig. 3.



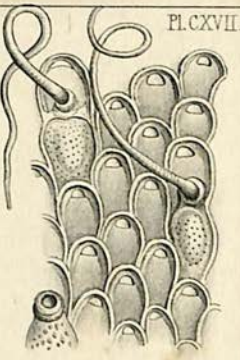
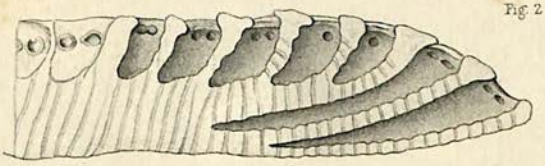


Fig. 2.

Fig. 4.



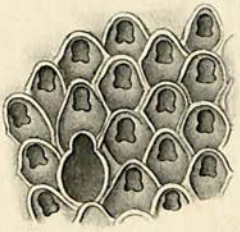
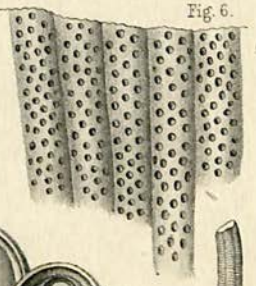


Fig. 5.

Fig. 6.



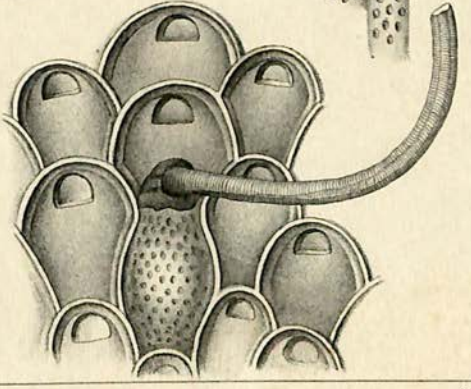


Fig. 7.

Fig 4.

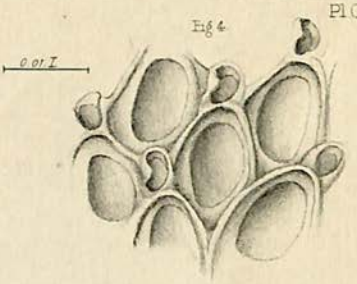


Fig 1.

Fig 2.

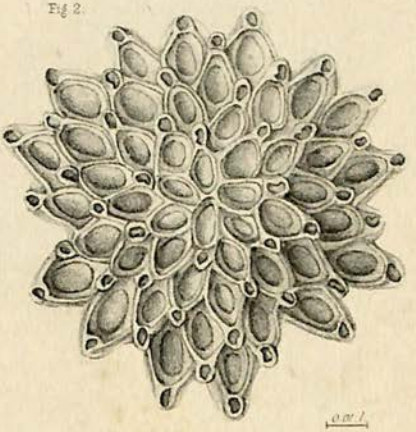
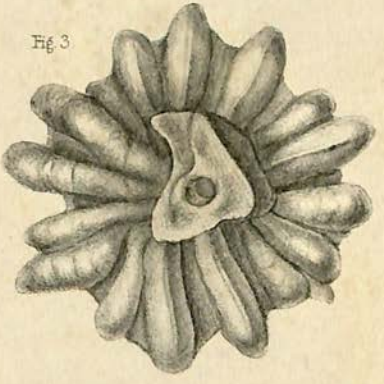
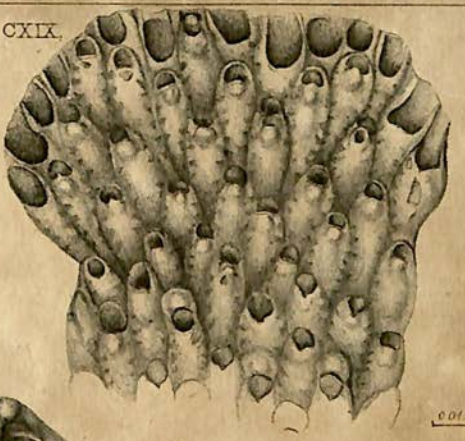


Fig 3.



Pl. CXIX.

Fig. 1.

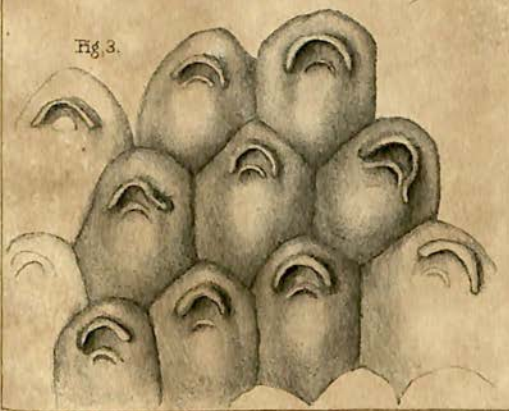


0.01 I

Fig. 2.

0.01 I

Fig. 3.



0.01 I

G.Busk del. C.R.Bone lith. Ford & West. Imp.

PL. CXX.

Fig 1.

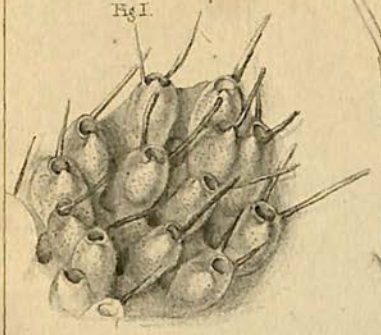


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Fig 2.

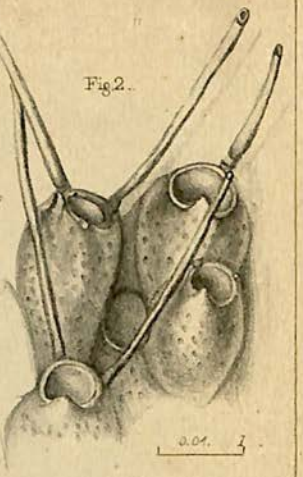

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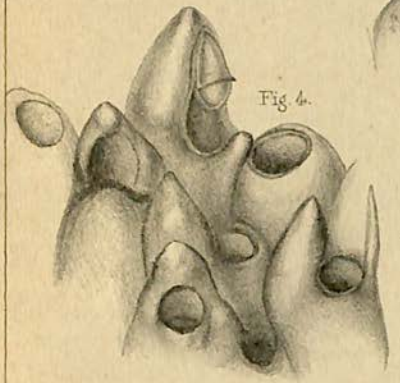
Fig. 4.



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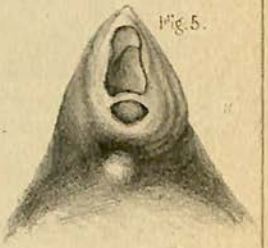

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Fig 3

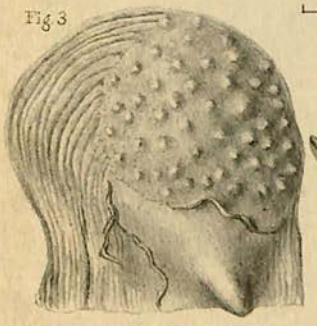
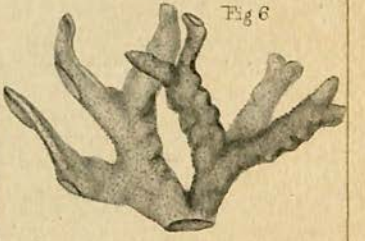


Fig 6



G.Buck del. C.R.Bone lith.

Ford & West. Imp.

Pl. CXXI.

Fig.1.

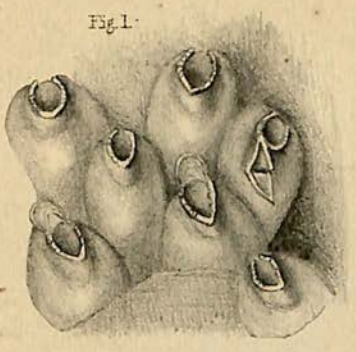


Fig.2.

Fig.8.

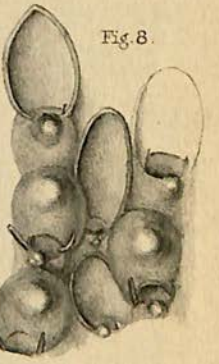


Fig.7.

Fig.6.

Fig.4.

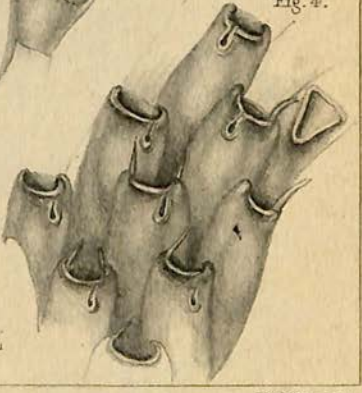


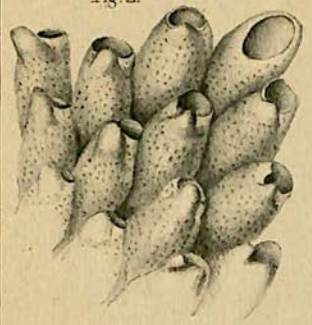
Fig.5.

0.01 I.

G.Hanks, del. C.M.Hime lith. Ford & West. Imp.

Pl. CXXII.

Fig. 2.



0.01 1

Fig. 1.

Fig. 3.

Fig. 4.

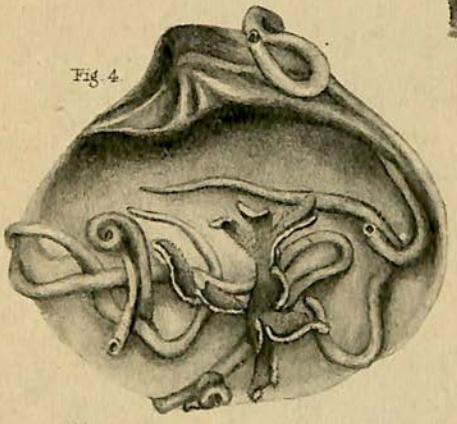


Fig. 5.

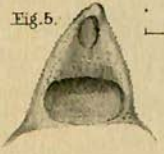


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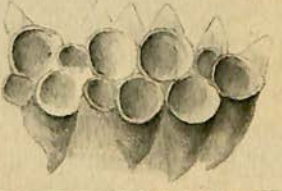
Fig. 6.



G.Busk del. C.R.Bone. lith. Ford & West. Imp. 54 Hatton Garden.

Fig. 1.

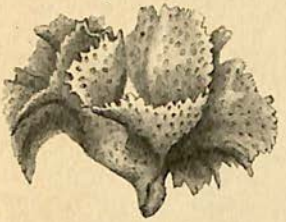
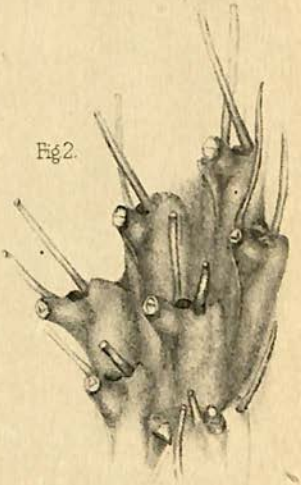


Fig. 6.

Fig. 3.

Fig. 2.



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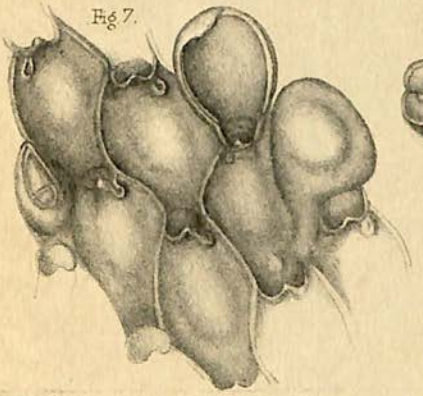


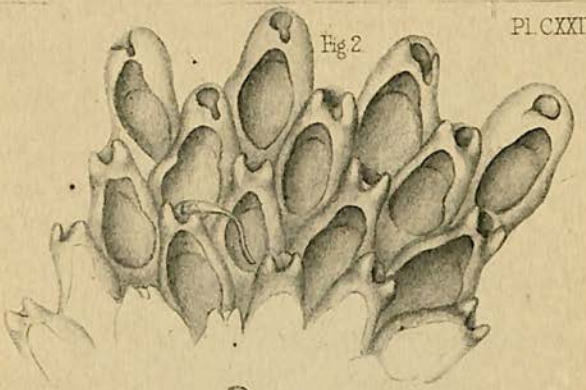
Fig. 4.

Fig. 5.

G. Busk. del. et. lith.

Ford & West. Imp.

Fig 2.



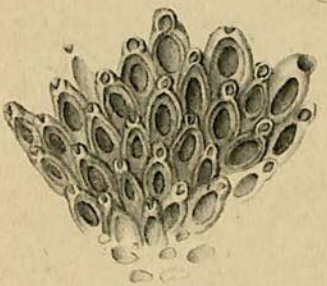
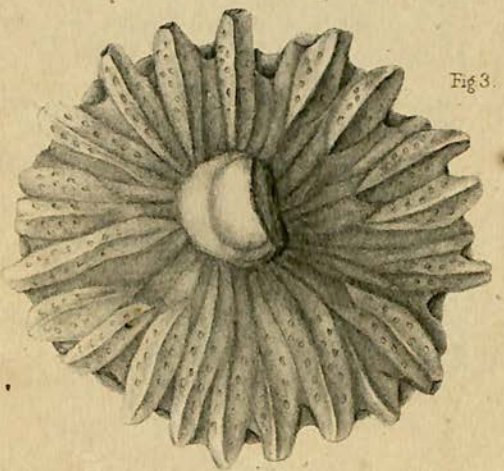


Fig 1.

Fig 3.



CATALOGUES

OF

THE ZOOLOGICAL COLLECTION

IN

THE BRITISH MUSEUM.

I. VERTEBRATA.

List of Mammalia. By Dr. J. E. GRAY, F.R.S. &c. 1843. 2*s.*6*d.*

Catalogue of the Mammalia. By Dr. J. E. GRAY, F.R.S. &c.

Part 1. Cetacea. 12mo, 1850. 4*s.*, with Plates.
Part 2. Seals. 12mo, 1850. 1*s.* 6*d.*, with Woodcuts.
Part 3. Hoofed Quadrupeds. Section I. (Ungulata furcipeda) 1852, with Plates of Genera, 12*s.*

This work contains the description of the genera and species, and figures of the chief characters of the genera.

List of Mammalia and Birds of Nepaul, presented by B. H. Hodgson, Esq., to the British Museum. By Dr. J. E. GRAY and G. R. GRAY. 1846. 2*s.*

List of Birds. By G. R. GRAY, F.L.S. &c.

Part 1. Raptorial. Edition 1, 1844; edition 2, 1848. 3*s.*
Part 2. Passeres. Section I. Fissirostres. 1848. 2*s.*
Part 3. Gallinæ, Grallæ and Anseres. 1844. 2*s.*

The other sections of the Passerine birds are in progress.

List of British Birds. By G. R. GRAY, F.L.S. &c. 1850. 4*s.*

List of the Eggs of British Birds. By G. R. GRAY, F.L.S. &c. 1852. 2*s.* 6*d.*

Catalogue of Reptiles. By Dr. J. E. GRAY, F.R.S., V.P.Z.S. &c.

Part 1. Tortoises, Crocodiles and Amphisbænians. 1844. 1*s.*
Part 2. Lizards. 1845. 3*s.* 6*d.*
Part 3. Snakes (Crotalidæ, Viperidæ, Hydridæ and Boidæ). 1849. 2*s.* 6*d.*
Part 4, completing the Snakes (Colubridæ), is in preparation.

Catalogue of Amphibia. By Dr. J. E. GRAY, F.R.S., V.P.Z.S.

Part 2. Batrachia Gradientia. 12mo, 1850. 2*s.* 6*d.* with Plates of the Skull and Teeth.

Catalogue of Fish. By Dr. J. E. GRAY, F.R.S., V.P.Z.S.

Part 1. Cartilaginous Fish. 12mo, 1851. 3*s*. With two Plates.

These Catalogues of *Reptiles, Amphibia,* and *Fish,* contain the characters of all the genera and species at present known; the latter are illustrated with figures of the genera.

List of British Fish; with Synonyma. By A. WHITE, F.L.S. &c. 1851. 3*s*.

List of Osteological Specimens. By Dr. J. E. GRAY, F.R.S. &c. and G. R. GRAY, F.L.S. 1847. 2*s*.

II. ANNULOSA.

Catalogue of Lepidoptera. By G. R. GRAY, F.L.S.

Part 1. Papilionidæ, with coloured figures of the new species. £1 : 5*s*. 4to, 1852.

List of Lepidopterous Insects. By E. DOUBLEDAY, F.L.S.

Part 1. Papilionidæ, &c. 1844. 2*s*. 6*d*.
Part 2. Erycinidæ, &c. 1847. 9*d*.
Part 3. Appendix to Papilionidæ, Erycinidæ, &c. 1848. 9*d*.

List of Hymenopterous Insects. By F. WALKER, F.L.S.

Part 1. Chalcididæ. 1846. 1*s*. 6*d*.
Part 2. Additions to Chalcididæ. 1848. 2*s*.

Catalogue of Hymenopterous Insects. By FREDERICK SMITH, M.E.S.

Part 1. Andrenidæ, &c. 1853. 2*s*. 6*d*., with Plates.

Catalogue of Dipterous Insects. By F. WALKER, F.L.S.

Part 1. 1848. 3*s*. 6*d*.
Part 2. 1849. 3*s*. 6*d*.
Part 3. 1849. 3*s*.
Part 4. 1849. 6*s*.

Catalogue of Homopterous Insects. By F. WALKER, F.L.S.

Part 1. 1850. 3*s*. 6*d*.
Part 2. 1850. 5*s*.
Part 3. 1851. 3*s*. 6*d*.
Part 4. 1852. 4*s*., with Plates.

Catalogue of Neuropterous Insects. By F. WALKER, F.L.S.

Part 1. 1852. 2*s*. 6*d*.
Part 2. 1853. 3*s*. 6*d*.
Part 3. 1853. 1*s*. 6*d*.

The Catalogues of *Hymenopterous, Dipterous,* and *Homopterous* Insects contain the description of the species in the Museum which appeared to be undescribed.

Catalogue of Hemipterous Insects. By W. S. DALLAS, F.L.S. &c. With Plates, Part 1. 1851. 7*s*. Part 2. 1852. 4*s*.

The Catalogue of *Hemiptera* contains the description of the new species in the Museum Collection, and figures of the more interesting genera.

Nomenclature of Coleopterous Insects (with characters of new species).

Part 1. Cetoniadæ. 1847. 1*s*. By A. WHITE, F.L.S. &c.
Part 2. Hydrocanthari. 1847. 1*s*. 3*d*. By A. WHITE, F.L.S.
Part 3. Buprestidæ. 1848. 1*s*. By A. WHITE, F.L.S.
Part 4. Cleridæ. 1849. 1*s*. 8*d*. By A. WHITE, F.L.S.
Part 5. Cucujidæ. 1851. 6*d*. By F. SMITH, M.E.S.
Part 6. Passalidæ. 1852. 8*d*. By F. SMITH, M.E.S.
Part 7. Longicornia, with Plates, 1853. 2*s*. 6*d*. By A. WHITE, F.L.S.

List of Crustacea; with Synonyma. By A. WHITE. 1847. 2*s*.

List of Myriapoda. By G. NEWPORT, F.R.S. &c. 1844. 4*d*.

List of British Lepidoptera; with Synonyma. By J. F. STEPHENS, F.L.S. Part 1. 1850. 5*s*. Part 2. 1852. 2*s*. Part 3. 1853. 9*d*.

List of British Aculeate Hymenoptera; with Synonyma, and the description of some new species. By F. SMITH. 1851. 2*s*.

List of British Anoplura, or Parasitic Insects; with Synonyma. By H. DENNY. 1*s*.

List of British Crustacea; with Synonyma. By A. WHITE, F.L.S. 1850. 2*s*. 6*d*.

Catalogue of Entozoa; with Plates. By W. BAIRD, M.D., F.L.S. 1853. 2*s*.

III. MOLLUSCA.

Catalogue of the Mollusca in the Collection of the British Museum. By Dr. J. E. GRAY, F.R.S., &c.

Part 1. Cephalopoda Antepedia. 1849. 4*s*.
Part 2. Pteropoda. 1850. 1*s*.
Part 3. Placuniadæ and Anomiadæ. 1850. 4*d*.
Part 4. Brachiopoda Ancylopoda; figures of genera. 1853. 3*s*.

Containing the characters of the recent and fossil genera, and the descriptions of all the recent species at present known.

Catalogue of Phaneropneumona or Operculated Terrestrial Mollusca. By Dr. LOUIS PFEIFFER. 1852. 5*s*.

Catalogus Concharum Bivalvium. By M. G. P. DESHAYES.

Part 1. Veneridæ, &c. 1853. 3*s*.

List of British Mollusca and Shells; with Synonyma. By Dr. J. E. GRAY, F.R.S.

Part 1. Acephala and Brachiopoda. 1851. 3*s.* 6*d.*

Nomenclature of Mollusca. By Dr. W. BAIRD, F.L.S. &c.

Part 1. Cyclophoridæ. 1851. 1*s.* 6*d.*

IV. RADIATA.

Catalogue of Marine Polyzoa. By G. BUSK, F.R.S. &c., with characters and figures of all the species.

Part 1. Chilostoma. 1852. 17*s.*

Catalogue of the Echinidæ or Sea Eggs. By Dr. J. E. GRAY, F.R.S.

Part 1. Echinida irregularia. 12mo, with Plates.

Containing the characters of all the known genera and species, and illustrated with figures of the new species.

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